

# Exhibit 3

**UNITED STATES DISTRICT COURT  
MIDDLE DISTRICT OF NORTH CAROLINA**

SHAUNA WILLIAMS, et al.,

*Plaintiffs,*

v.

REPRESENTATIVE DESTIN HALL, in his  
official capacity as Chair of the House Standing  
Committee on Redistricting, et al.,

*Defendants.*

Civil Action No. 23 CV 1057

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NORTH CAROLINA STATE CONFERENCE OF  
THE NAACP, et al.,

*Plaintiffs,*

v.

PHILIP BERGER, in his official capacity as the  
President Pro Tempore of the North Carolina  
Senate, et al.,

*Defendants.*

**EXPERT REPORT OF DR. JONATHAN RODDEN**

August 1, 2024

## I. INTRODUCTION AND SUMMARY OF FINDINGS

I have been asked to examine the role of race in North Carolina's 2023 Congressional Plan (the 2023 Plan), which was enacted by the General Assembly as Senate Bill 757 on October 25, 2023. First, I have been asked to examine the extent to which the districts were drawn in a way that sorted residents in and out of districts according to race, paying special attention to three regions: the Piedmont Triad area (District 6 in particular), the Charlotte area (Districts 12 and 14 in particular), and the Northeast part of the state (District 1). Second, I have been asked to examine whether the 2023 Plan as a whole treats Black and White North Carolina residents differently from one another in terms of representation.

To complete the first task, I examine the geographic characteristics of the districts, showing that that the 2023 Plan reduced the compactness of the challenged districts and split counties and municipalities in the Piedmont Triad and Charlotte regions more than the previous plan did. I also describe the racial composition of the new districts, demonstrating a pattern of moving significant clusters of Black voters into and out of congressional districts in the 2023 Plan.

Next, I utilize two techniques for analyzing racial sorting. First, using the so-called "envelope" approach that I describe below, I find that:

- In the Piedmont Triad, *White* registered voters are disproportionately placed in District 6.
- In the Charlotte area, *Black* registered voters are far more likely to be placed in District 12, and *White* registered voters are far more likely to be placed in District 14.
- In the Northeast, it is somewhat more likely that *Black* voters are placed in District 1.

Notably, the same patterns hold up among Democrats, Republicans, and unaffiliated voters, indicating that this racial sorting cannot be explained as a mere byproduct of partisan sorting. And the racial differences—including within each partisan category—remain when I control for distance from the median population center of each challenged district and, in Districts 12 and 14, for residence in Charlotte, and in District 6, for residence in High Point or Greensboro.

Second, for each challenged district, I provide basic descriptive statistics about the race of voters in the areas that overlap between the 2022 and 2023 districts (the district "core"), the areas moved into the 2023 district, and the areas moved out of the 2022 district. This approach shows:

- In District 6, the core of the district is small, and *Black* voters were disproportionately moved out of the district, while *White* voters were disproportionately moved in.
- In District 12, the core has a much larger Black population than the 2022 district, and a larger Black population was moved into the district than that which was moved out.
- In District 14, the racial composition of the core is similar to the 2022 district, but *Black* voters were disproportionately moved out of the district, while *White* voters were disproportionately moved in.
- In Districts 6, 12, and 14, these patterns hold up within each partisan group, again indicating that racial sorting cannot be explained away by partisanship.
- In District 1, Black voters in Greenville were moved out of the district, but a very similar number of relatively rural Black voters were moved in. Although the movement of voters

had little impact on the Black voting-age population in District 1, the district was significantly reconfigured. This suggests the potential use of a racial target.

To complete the second task, I examined the extent to which residents were moved across districts in the 2023 Plan, the distance of those moves, the extent to which prior districts were fragmented, and the extent to which geographically clustered members of racial groups were placed in different districts. I demonstrate that Black voters were substantially more likely to be moved from one district to another—especially in the Piedmont Triad area—and that their old districts were more substantially redrawn than those of White voters. Moreover, Black voters were disproportionately moved into geographically heterogeneous districts where the median population center is further away from them, and into districts that break up geographically compact clusters of members of the same race and place them in districts dominated by voters of other races.

## II. QUALIFICATIONS AND EXPERIENCE

I am currently a tenured Professor of Political Science at Stanford University and the founder and director of the Stanford Spatial Social Science Lab—a center for research and teaching with a focus on the analysis of geo-spatial data in the social sciences. I am engaged in a variety of research projects involving large, fine-grained geo-spatial data sets including ballots and election results at the level of polling places, individual records of registered voters, census data, and survey responses. I am also a senior fellow at the Stanford Institute for Economic Policy Research and the Hoover Institution. Prior to my employment at Stanford, I was the Ford Professor of Political Science at the Massachusetts Institute of Technology. I received my Ph.D. from Yale University and my B.A. from the University of Michigan, Ann Arbor, both in political science. A copy of my current C.V. is included as Exhibit A.

In my current academic work, I conduct research on voting, demographics, geography, and aspects of election administration, including registration, the structure of precincts, redistricting, and methods of voting. Recent papers and books focus on the relationship between the patterns of political representation, geographic location of demographic and partisan groups, and the drawing of electoral districts. I have published papers using statistical methods to assess political geography, balloting, and representation in a variety of academic journals including *Statistics and Public Policy*, *Proceedings of the National Academy of Science*, *Science Advances*, *American Economic Review Papers and Proceedings*, the *Journal of Economic Perspectives*, the *Virginia Law Review*, the *American Journal of Political Science*, the *British Journal of Political Science*, the *Annual Review of Political Science*, and the *Journal of Politics*. One of these papers was selected by the American Political Science Association as the winner of the Michael Wallerstein Award for the best paper on political economy, and another received an award from the American Political Science Association section on social networks.

In 2021, I received a John Simon Guggenheim Memorial Foundation Fellowship, and, for my 2006 book *Hamilton's Paradox: The Promise and Peril of Fiscal Federalism*, received the Martha Derthick Award of the American Political Science Association for “the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations.”

I have recently written a series of papers, along with my co-authors, using automated redistricting algorithms to assess partisan gerrymandering. This work has been published in the *Quarterly Journal of Political Science*, *Election Law Journal*, and *Political Analysis*, and it has been featured in more popular publications like the *Wall Street Journal*, the *New York Times*, and *Boston Review*. I authored a book titled *Why Cities Lose*, published by Basic Books in June of 2019, on the relationship between political districts, the residential geography of social groups, and their political representation in the United States and other countries that use winner-take-all electoral districts. The book was reviewed in *The New York Times*, *The New York Review of Books*, *Wall Street Journal*, *The Economist*, and *The Atlantic*, among others.

I have expertise in the use of large data sets and geographic information systems (GIS) and conduct research and teaching on applied statistics related to elections. I frequently work with geo-coded voter files and other large administrative data sets, including in recent papers published in the *Annals of Internal Medicine* and *The New England Journal of Medicine*. I have developed a national data set of geo-coded precinct-level election results that has been used extensively in policy-oriented research related to redistricting and representation.

I have been accepted and testified as an expert witness in a number of election law and redistricting cases: *Romo v. Detzner*, No. 2012-CA-000412 (Fla. Cir. Ct. 2012); *Mo. State Conference of the NAACP v. Ferguson-Florissant Sch. Dist.*, No. 4:2014-CV-02077 (E.D. Mo. 2014); *Lee v. Va. State Bd. of Elections*, No. 3:15-CV-00357 (E.D. Va. 2015); *Democratic Nat’l Committee et al. v. Hobbs et al.*, No. 16-1065-PHX-DLR (D. Ariz. 2016); *Bethune-Hill v. Virginia State Board of Elections*, No. 3:14-cv-00852-REP-AWA-BMK (E.D. Va. 2014); and *Jacobson et al. v. Lee*, No. 4:18-cv-00262 (N.D. Fla. 2018), *Rivera v. Schwab*, No. 2022-cv-89 (Kan. Dist. Ct. 2022), *Carter v. Chapman*, No. 464 MD 2021, 465 MD 2021 (Pa. Commw. Ct. 2021); *Bennet v. Ohio Redistricting Comm’n*, No. 2021-1198 (Ohio 2021); *Adams v. DeWine*, No. 2021-1428 (Ohio 2021); *Neiman v. LaRose*, No. 2022-0298 (Ohio 2022); *Agee, Jr. et al v. Benson et al*, No. 1:22-cv-00272 (W.D. Mi. 2023). I also worked with a coalition of academics to file Amicus Briefs in the Supreme Court in *Gill v. Whitford*, No. 16-1161, and *Rucho v. Common Cause*, No. 18-422. Much of the testimony in these cases had to do with geography, electoral districts, voting, ballots, and election administration.

### III. MATERIALS CONSULTED

From the North Carolina State Board of Elections (NCSBE) at <http://www.ncsbe.gov>, I accessed North Carolina 2022 general election precinct-level boundaries in shapefile format, as well as boundaries of each district in the 2022 Congressional Plan (used in the 2022 general election) and in the 2023 Congressional Plan. From the NCSBE, I also downloaded a “voter registration snapshot” from March 7, 2023.<sup>1</sup> From the United States Census Department, via the National Historical GIS ([nhgis.org](http://nhgis.org)), I accessed block-level redistricting data from the 2020 decennial census, including data on race, as well as boundary files for North Carolina census blocks and

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<sup>1</sup> <https://dl.ncsbe.gov/index.html?prefix=data/Snapshots/>

counties, and population counts by race at the level of census places. I also accessed city boundary data assembled by the North Carolina Department of Transportation.

#### **IV. THE ROLE OF RACE IN DRAWING THE 2023 NORTH CAROLINA CONGRESSIONAL REDISTRICTING PLAN**

To assess the predominance of race in a redistricting plan using data, U.S. federal courts have relied on a series of analyses presented in an expert report by Dr. Stephen Ansolabehere in *Harris v. McCrory*, No. 1:13-cv-00949-WO-JEP (M.D.N.C. 2013), a case challenging last decade's congressional districts in North Carolina. This analysis was explicitly accepted by the U.S. Supreme Court in *Cooper v. Harris*, 136 S. Ct. 2512 (2017). In *Alexander v. South Carolina State Conference of the NAACP*, 144 S. Ct. 1221 (2024), the Court reaffirmed its support for this approach, while characterizing some of the expert testimony in that case as deviating in important ways from the Ansolabehere approach in *Cooper v. Harris*.

Specifically, in footnote 9 of the majority opinion in *Alexander*, the Court pointed out that “Professor Ansolabehere’s analysis operated at the voter level,” whereas experts in South Carolina were forced to use precinct-level data. Since this report, like Dr. Ansolabehere’s *Harris* report, concerns North Carolina, I am also able to use the same rich individual-level data from the voter registration record on party registration and self-reported race that was used there. Footnote 9 of the *Alexander* majority opinion also stated that in order to disentangle party and race, it is important to examine whether there are racial differences between those kept in and out of specific challenged districts not only among Democrats, but also among Republicans (and presumably among unaffiliated voters). The individual-level data in North Carolina also allow me to examine such differences.

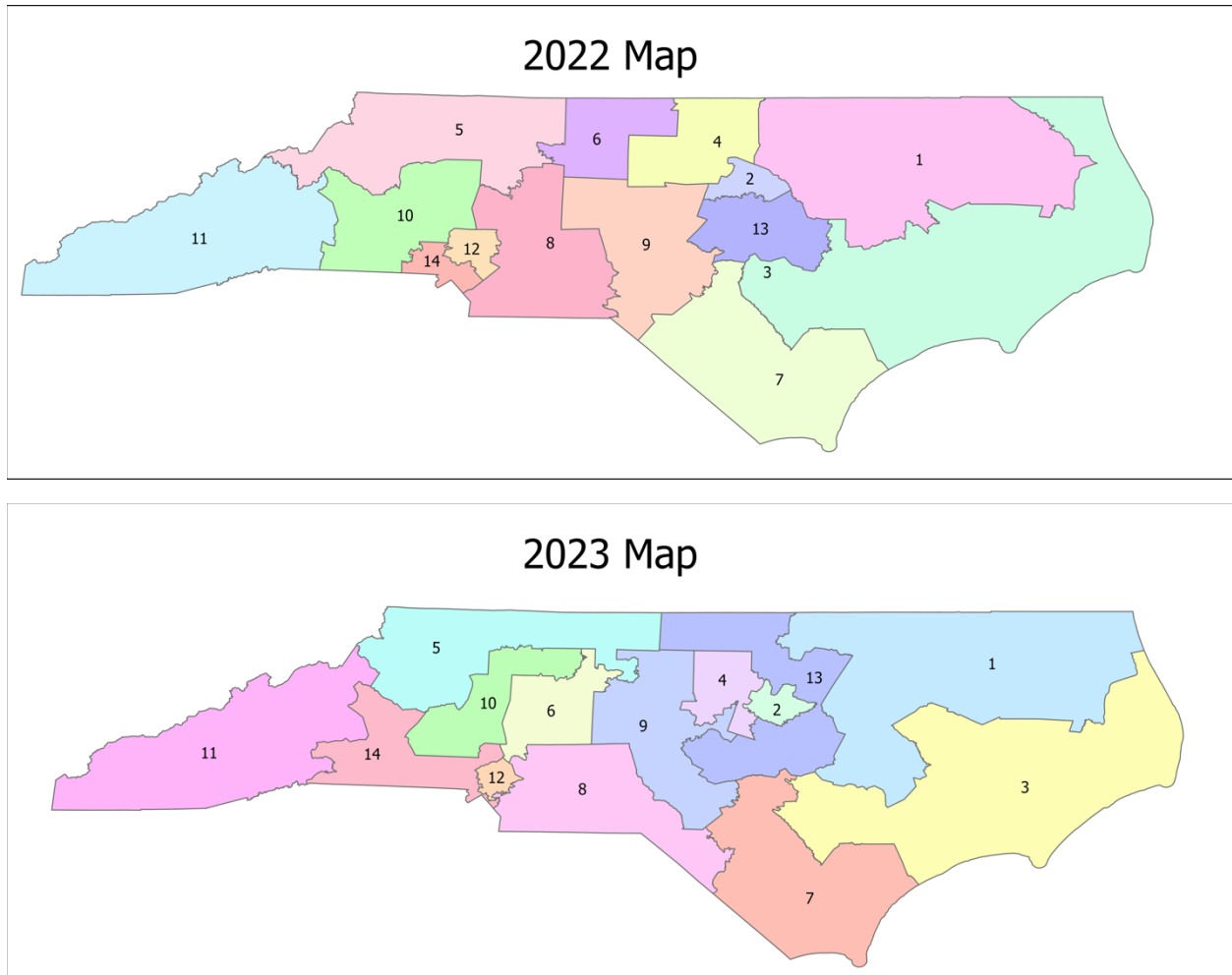
Because of the Court’s repeated endorsements of Dr. Ansolabehere’s analysis, this section of my report follows the organization of his approach very closely and uses the same format for presenting quantitative information in tables. It begins by discussing the geographic and racial characteristics of the districts, and then discusses two techniques for assessing race as a factor in the composition of the districts.

This analysis will demonstrate that racial sorting worked differently in the Piedmont Triad, the Charlotte area, and in the Northeast part of the state. In the Piedmont Triad, the 2023 Plan disperses Black voters by removing them from their residential context and combining them with distant rural White voters. In the Charlotte area, the 2023 Plan concentrates Black voters into District 12 while removing them from District 14. In the Northeast, the 2023 Plan completely reconfigures District 1 while keeping the Black voting-age population (BVAP) essentially the same.

##### Geographic Characteristics

The 2023 Plan deviates very substantially from the court-ordered 2022 Plan in several ways, most notably in and around the challenged districts. Figure 1 shows these changes visually, by providing simple maps of both redistricting plans.

**Figure 1: 2022 and 2023 Congressional Plans**



I will now consider the differences across the two plans under the traditional redistricting criteria of compactness and respect for county and municipal boundaries. The Piedmont Triangle, the Charlotte area, and the Northeast were all substantially redrawn, each with an arrangement that was substantially less compact than in the 2022 Plan. In particular, the area included in District 6 under the 2022 Plan is now divided across Districts 5, 6, 9, 10, and 13 in the 2023 Plan.

#### Compactness

Table 1 presents two of the most commonly used measures of district compactness in federal courts: Reock and Polsby-Popper. For both measures, higher numbers indicate greater compactness.

By both measures, the compactness of District 6 decreased. It is also useful to examine the other districts into which the 2022 District 6 was divided. Relative to their 2022 versions, Districts 9, 10, and 13 also each became substantially less compact in the 2023 Plan.

By both measures, Districts 12 and 14 in the Charlotte area became less compact. The same can be said for two other districts, Districts 8 and 11, that were substantially affected by the redrawing

of Districts 12 and 14. In fact, the only district that did not clearly become less compact in the Western half of the state was District 5, which became only slightly less compact on the Reock measure and stayed the same on the Polsby-Popper measure.

In the Northeast, District 1 became slightly less compact according to the Reock measure, and substantially less compact according to the Polsby-Popper measure.

Considering the 2023 Plan as a whole, on the Reock measure, only 3 districts out of 14 have similar or slightly better compactness measures than in the 2022 Plan: Districts 2 and 4 in the Raleigh-Durham area and District 7 in the southern part of the state. And on the Polsby-Popper measure, only District 3 in the Southeast became more compact in the 2023 Plan, while the score for District 5 did not change. Accordingly, the average compactness scores across all districts in the 2023 Plan went down by both measures, as indicated in the penultimate line in Table 1. The last line in Table 1 calculates averages for all the districts West of Raleigh-Durham, showing that the decline in compactness is driven primarily by the districts in the western part of the state, which include Districts 5, 6, 8, 9, 10, 11, 12, and 14.

**Table 1: Compactness Comparisons**

District	Reock		Polsby-Popper	
	2022 Plan	2023 Plan	2022 Plan	2023 Plan
1	0.379	0.361	0.383	0.261
2	0.342	0.397	0.322	0.277
3	0.338	0.308	0.200	0.249
4	0.413	0.491	0.455	0.256
5	0.254	0.240	0.219	0.219
6	0.428	0.408	0.405	0.297
7	0.456	0.538	0.369	0.286
8	0.535	0.319	0.325	0.274
9	0.519	0.439	0.308	0.171
10	0.414	0.258	0.341	0.272
11	0.306	0.263	0.305	0.265
12	0.607	0.571	0.365	0.280
13	0.456	0.379	0.296	0.139
14	0.369	0.294	0.236	0.160
NC Average	0.415	0.376	0.323	0.243
West NC Average	0.429	0.349	0.313	0.242



### Respect for County and Municipal Boundaries

Let us define the Piedmont Triad according to the census designation of the combined statistical area (CSA): the counties of Alamance, Rockingham, Guilford, Randolph, Stokes, Forsyth, Davidson, Davie, Yadkin, and Surry.<sup>2</sup> Of these counties, the 2022 Plan split only one—Forsyth—once. The 2023 Plan splits Forsyth County once, too, but it also splits Guilford County twice—into three different districts. In other words, the 2022 Plan involved one county split in the Piedmont Triad, whereas the 2023 Plan involves three.

Within Forsyth County, the 2022 Plan split the municipalities of Winston-Salem and Walkertown. The 2023 Plan also split Winston-Salem and Walkertown, and it additionally split Clemmons and Kernersville. In Guilford County, the 2022 Plan did not split any municipalities, whereas the 2023 Plan splits the city of Greensboro into three different districts, while also splitting High Point, Summerfield, and Jamestown. In sum, the 2022 Plan includes only 2 split municipalities in the Piedmont Triangle, while the 2023 Plan included 9 total municipality splits, including of each of the major cities: Winston-Salem, High Point, and Greensboro (twice).

The Charlotte-Concord Gastonia Metropolitan Statistical Area (MSA) includes the counties of Anson, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Union, and Carrabus. The 2022 Plan only split Gaston and Mecklenburg, once each. The 2023 Plan leaves Gaston County whole but splits Mecklenburg an additional time and also splits Cabarrus, for a total of 2 county splits in the 2022 Plan versus 3 in the 2023 Plan.

In the 2022 Plan, the city of Gastonia in Gaston County was split once, and the cities of Charlotte and Matthews in Mecklenburg County were each split once—for a total of 3 splits in the Charlotte MSA. In the 2023 Plan, the municipalities of Concord and Kannapolis in Carrabus County are each split once; in Mecklenburg County, all three municipalities to the South and East of Charlotte—Mint Hill, Matthews, and Pineville—are split, and Charlotte itself is split into three different districts—for a total of 7 splits in the Charlotte MSA.

Turning to the Northeast, the 2022 Plan included a split of Pitt County, which involved the split of a small fragment of the city of Greenville. The 2023 Plan includes a split of Granville County, which involves the split of a small fragment of the town of Oxford.

In sum, relative to the prior plan, the 2023 Plan involves three times as many county splits and more than four times as many municipal splits in the Piedmont Triangle. And relative to the prior plan, the 2023 Plan involves an extra county split in the Charlotte area, and more than twice as many municipal splits, including an extra split of Charlotte itself. Finally, in the Northeast, the number of county and municipal splits are identical in the 2022 and 2023 Plans.

### Racial Composition of Districts

Many of these municipal splits, and the corridors and appendages that reduced the compactness of the districts, are concentrated in areas with relatively large Black populations. These maneuvers led to significant changes in the distribution of racial groups across congressional districts.

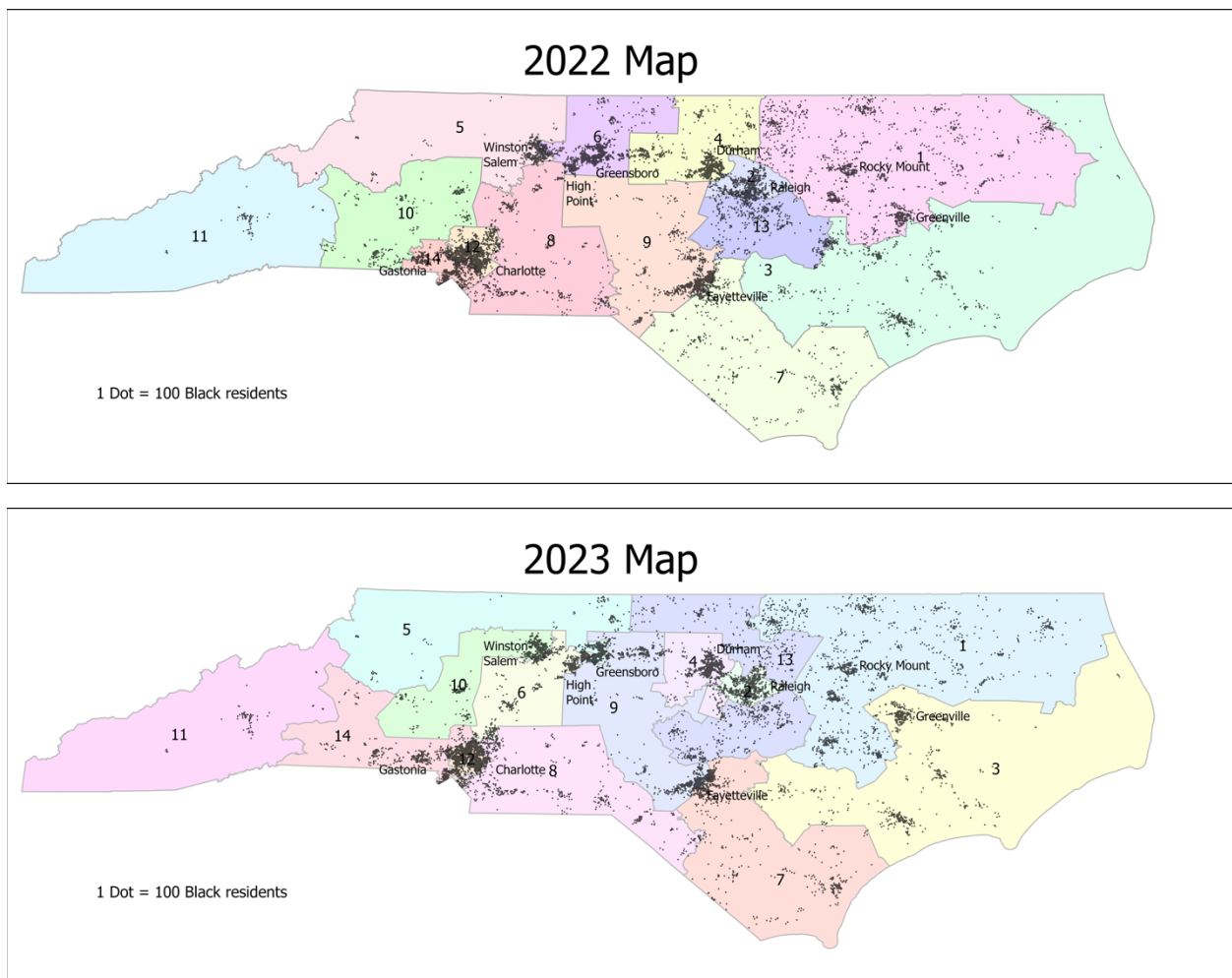
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<sup>2</sup> [https://www2.census.gov/geo/maps/econ/ec2012/csa/EC2012\\_330M200US268M.pdf](https://www2.census.gov/geo/maps/econ/ec2012/csa/EC2012_330M200US268M.pdf)

Figure 2 superimposes a dot density map of the North Carolina Black population from the 2020 census, where each dot corresponds to 100 residents, on the 2022 and 2023 Plans. The top 10 census places with the largest Black populations are labeled. Table 2 displays the data for BVAP by district in the 2022 and 2023 Plans.

In the 2022 Plan, much of the Black population in the Piedmont Triad, including the entire cities of Greensboro and High Point, was included in District 6. As will be shown in further detail below, the 2023 Plan splits each of the cities of the Piedmont Triad and extracts Black voters, placing them in a narrow appendage to districts that are dominated by faraway rural White voters. This had the effect of reducing the BVAP of District 6 from 32 percent to 19 percent.

**Figure 2: Dot Density Map of Black Population and 2022 and 2023 Congressional Plans**



The Black voters removed from District 6 by carving up the cities of the Piedmont Triad were scattered across several districts. Districts 5 and 10, which were and still are overwhelmingly White, were among the largest recipients, and they experienced increases in BVAP. Much of the Black population of Winston-Salem was extracted from the Piedmont Triad districts and placed in District 10, which is dominated by rural White areas to the Southwest. District 5 extracts Black

neighborhoods from Greensboro and combines them with distant, rural White populations to the West. District 6 now extracts some Black neighborhoods from High Point and Greensboro and combines them with White, rural areas to their Southwest.

A similar pattern can be seen with other relatively large Black communities. For example, in the 2022 Plan, Gastonia had been combined with other proximate Black communities in District 14, but in the 2023 Plan, it was separated from those communities and placed in a far less compact District 14 that is dominated by rural communities to the West. And Greenville, which had previously been combined with other Black communities to the North in District 1, was placed in the 2023 Plan in an appendage to District 3, which is dominated by rural White voters.

**Table 2: Distribution of Black Voting-Age Population Across Districts**

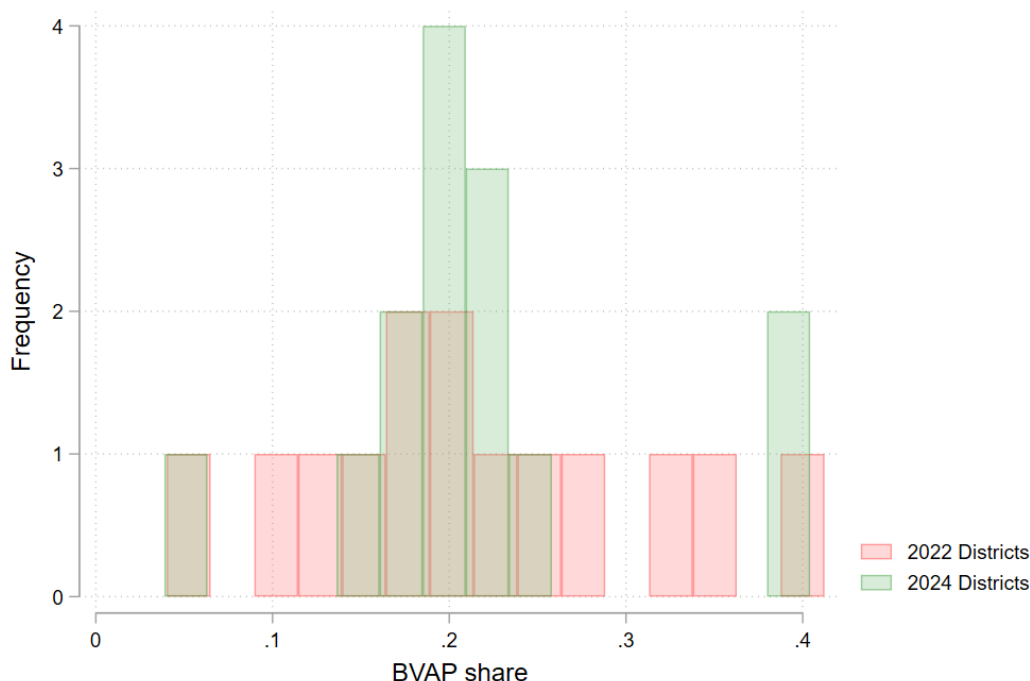
District	BVAP 2022	BVAP 2023	BVAP Change
1	41.23%	40.42%	-0.81%
2	18.18%	24.01%	5.83%
3	18.89%	21.35%	2.46%
4	26.64%	21.73%	-4.91%
5	12.51%	18.73%	6.22%
6	31.65%	19.31%	-12.34%
7	19.01%	20.07%	1.06%
8	14.48%	17.69%	3.21%
9	24.57%	22.36%	-2.21%
10	10.51%	16.58%	6.07%
11	4.01%	3.88%	-0.13%
12	35.96%	38.31%	2.35%
13	22.04%	19.45%	-2.59%
14	20.68%	15.93%	-4.75%

In sum, Black communities were newly split from one another and removed from their geographic contexts in 5 of the 10 largest Black concentrations in North Carolina: Greensboro, Winston-Salem, High Point, Greenville, and Gastonia. In Charlotte, the pattern was different. Black voters were removed from District 14 and placed in District 12, which already had a relatively high BVAP, leading to a BVAP increase in District 12 and a BVAP decrease in District 14, from 21 percent to 16 percent.

These maneuvers led to a change in the overall distribution of Black voters across districts, which can be visualized in Figure 3. In the 2022 Plan, district BVAP took on a wide range of values, whereas in the 2023 Plan, BVAPs are more tightly clustered around 20 percent. In the 2022 Plan, there were four districts where the BVAP was below 15 percent. In the 2023 Plan, there is only one such district. In the 2022 Plan, there were four districts with BVAP above 25 percent, whereas in the 2023 Plan, there are two, one of which (District 12) has a higher BVAP than in the 2022 Plan. Of 14 districts, 11 now have BVAP in the range between 15 and 25 percent. The difference

between the wider dispersion of BVAP across districts in the 2022 Plan, and the concentration around 20 percent in the 2023 Plan, is an outgrowth of racial sorting that concentrated Black voters in two districts in the 2023 Plan and broke up geographically contiguous Black communities elsewhere.

**Figure 3: Distribution of Black Voting-Age Population Across Districts in 2022 and 2023**



### Race as a Factor in the Composition of Districts

#### Piedmont Triad

In order to gauge the importance of race in the construction of the districts, the first type of analysis introduced in Dr. Ansolabehere’s report examines the “envelope” of counties in which a given district under the challenged map (here, the 2023 Plan) is situated—that is, the set of counties that are partially or wholly in the district. These are the counties containing the population from which a district could be drawn without crossing county boundaries or completely reconfiguring the district. This approach gives wide deference to the map-drawer in the basic configuration of a region, focusing on the final decisions about which precincts or vote tabulation districts (VTDs) to include and exclude. If the lines were drawn without respect to race, one would expect the likelihood of inclusion to be roughly similar for White and Black voters. Taking the envelope as the potential population of the district, one can then compute the likelihood that a registered voter of a given race from this population was included in District 6.

**Table 3: Envelope Analysis for CD 6**

Area	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 6	% of Group that is in CD 6
CD 6	Total	1,015,031	482,834	47.6%
	White	628,751	323,081	51.4%
	Black	243,006	92,825	38.2%

Table 3 presents the results of this analysis for District 6, for which the envelope is Forsyth, Davidson, Davie, Rowan, Cabarrus, and Guilford Counties. About 48 percent of the population from the envelope was included in District 6. Of White registered voters in the envelope, 51.4 percent were included, whereas only 38.2 percent of Black registered voters were included—a difference of 13.2 percentage points.

**Table 4: Envelope Analysis for CD 6, Broken Down by Partisan Group**

Party of Registration	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 6	% of Group that is in CD 6
Democrat	White	118,229	50,667	42.9%
	Black	182,418	68,738	37.7%
Republican	White	288,246	160,237	55.6%
	Black	5,718	2,483	43.4%
Unaffiliated	White	217,756	109,916	50.5%
	Black	54,080	21,289	39.4%

One possible explanation for this difference might be partisanship; since race and party are correlated, the apparent effect of race might be driven by party. To examine this possibility, within each major category of partisan registration (Democratic, Republican, and unaffiliated), I have

calculated the percent of each racial group placed in the district *within each partisan category*. This analysis is presented in Table 4.

Here, we see that White registered voters were substantially more likely to be placed in District 6 than Black registered voters *within each partisan category*. In footnote 9 of the majority opinion in *Alexander v. South Carolina State Conference of the NAACP*, 144 S. Ct. 1221 (2024), the Court stressed the importance of examining differences among Republicans. In District 6, we see that the racial difference in the likelihood of being placed in District 6 is largest among Republicans, but it is also substantial among unaffiliated and Democratic voters.

One concern, raised by the Supreme Court in *Alexander*, is that some VTDs in the envelope might be more likely to be included in a district because they are more geographically proximate to the district being constructed. Perhaps if those proximate VTDs have larger White population, this will explain the disproportionate selection of White voters into District 6. To examine this, I have located the median population center of District 6, and then calculated the distance from the centroid of each precinct in the envelope to the median population center of the district. I then estimate a probit regression,<sup>3</sup> where the observations are individual registered voters, and the dependent variable is an indicator of whether the individual is placed in District 6. The main independent variable is an indicator for whether the registered voter identifies as Black, but I also include a control variable for the distance (in kilometers) of the individual's VTD to the median population center of District 6. One might also claim that the General Assembly was attempting to keep as much of High Point as possible in District 6, and likewise with Greensboro in District 5, even though as described above, both cities were needlessly split. Nevertheless, in case these city boundaries played some role, I also include control variables that capture whether an individual resides in each of these cities. I calculate standard errors that are clustered at the level of the VTD.<sup>4</sup>

The results are detailed in the appendix. As one would expect, the coefficient on the “distance” variable is negative, indicating that VTDs in the envelope that are further from the median population center of the district are less likely to be included in the district. Likewise, residence in High Point is positively associated with inclusion in District 6, and residence in Greensboro is negatively associated with inclusion in the district. However, controlling for distance and city residence makes little difference for the race estimates. The estimated marginal effect of identifying as Black is -.11, indicating that the likelihood of a Black registered voter being included in District 6 is 11 percentage points lower than for registered voters of any other race, even controlling for distance and city residence. In Table 3 above, the difference was around 13 percentage points. Likewise, the estimates from the models for Democrats alone, Republicans alone, and unaffiliated voters alone, are very similar to the estimates that emerge from Table 4.

Figure 4 is a dot density map of race in the Piedmont Triad Region, along with the boundaries of the 2023 congressional districts. It demonstrates the extent to which Black neighborhoods of Winston-Salem were carved out of Forsyth County, and the correspondence of the district lines to the geography of race around High Point and Greensboro.

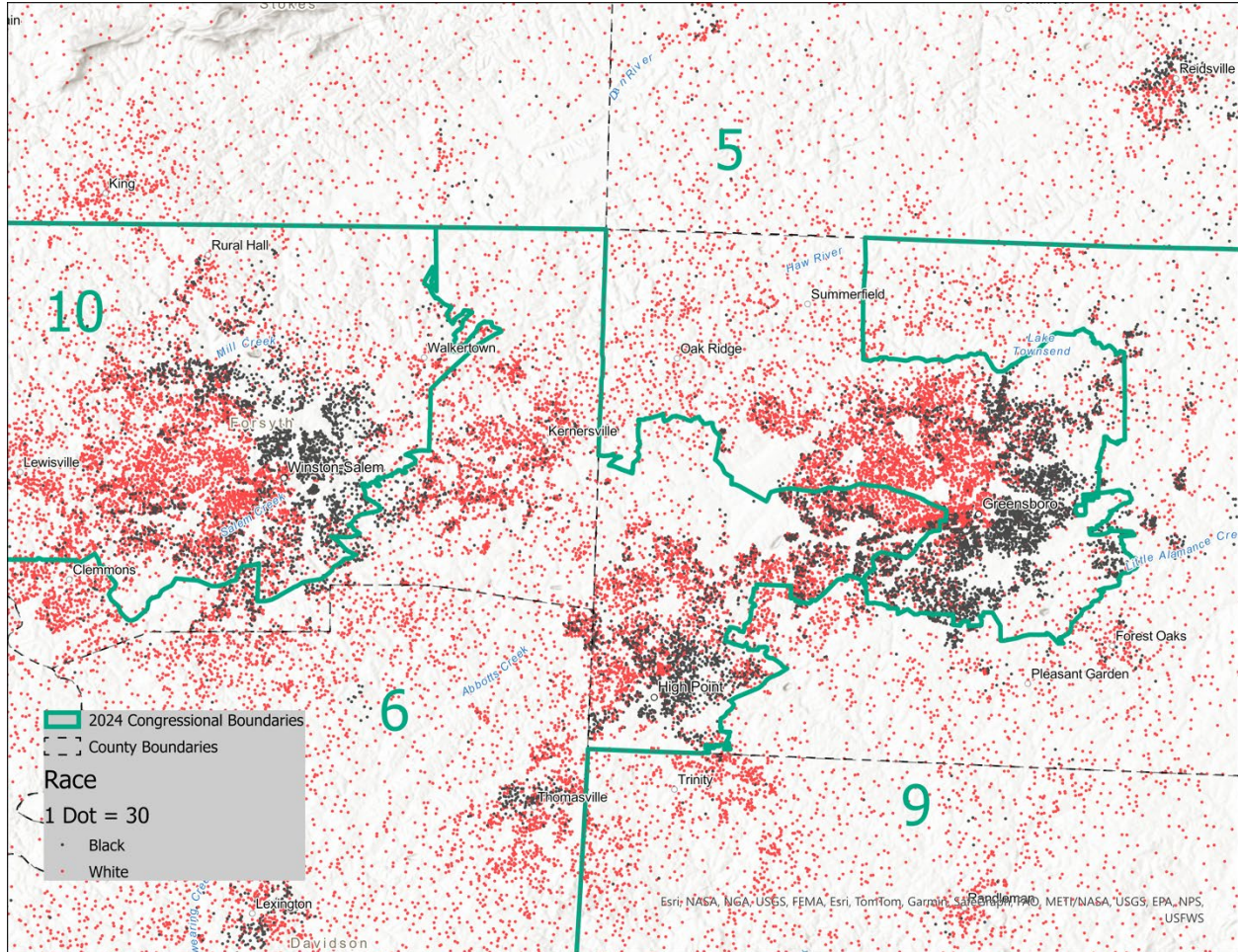
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<sup>3</sup> This is a type of regression model where the dependent variable can take on two values: 0 or 1.

<sup>4</sup> Note that this analysis captures the difference between Black and non-Black voters, not Black and White voters.

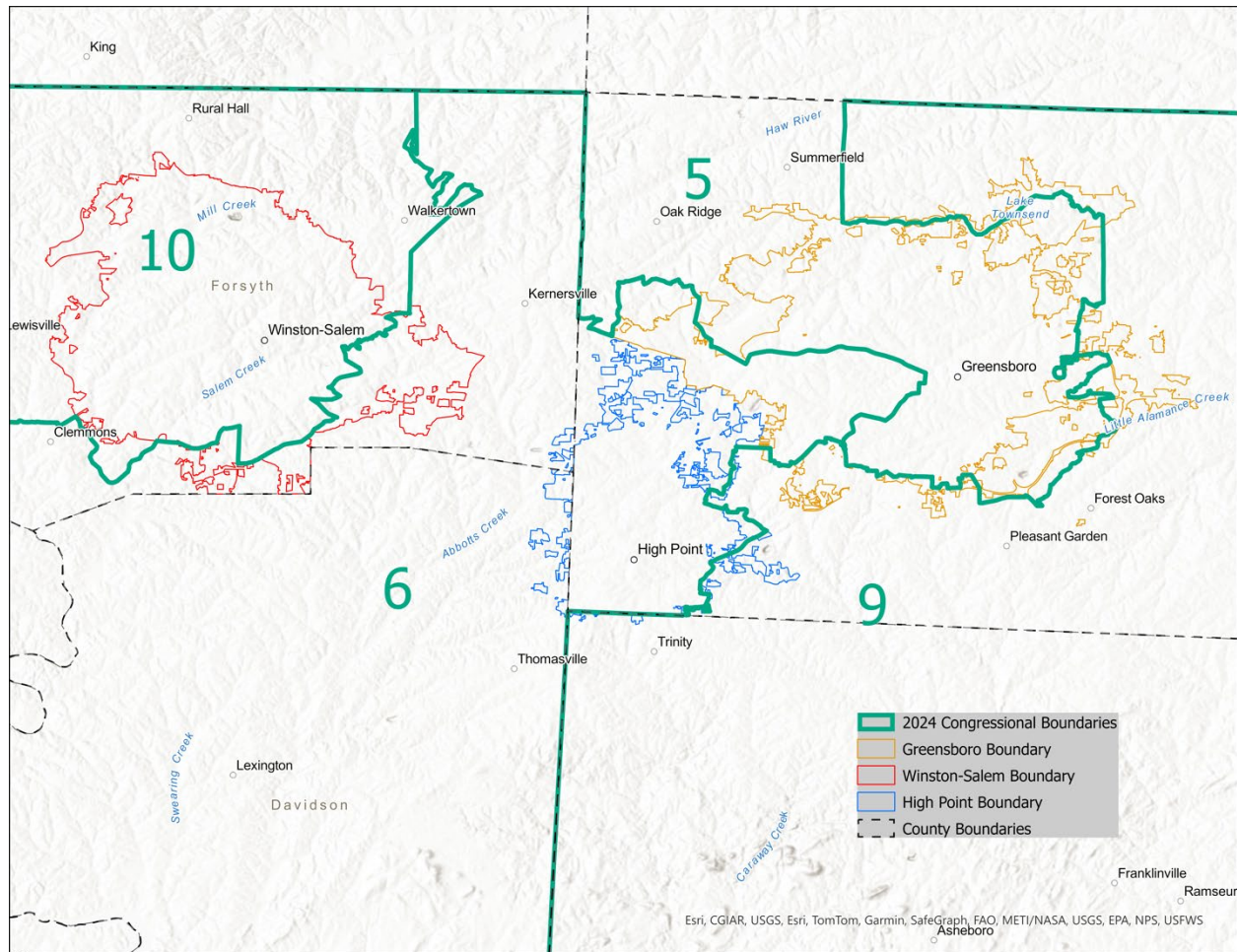


**Figure 4: Dot Density Map of Race in the Piedmont Triad Region**



As mentioned above, one might suspect that the correspondence between race and district boundaries emerged from an effort to avoid municipal splits. However, the structure of districts in the Piedmont Triad involved several unnecessary municipal splits. Moreover, as demonstrated in Figure 5, little care was taken to avoid municipal splits. Three separate non-contiguous fragments of Winston-Salem were placed in District 6. Several non-contiguous fragments of Greensboro were placed in District 9, in addition to the split of the city between Districts 5 and 6. In some cases, the boundaries of VTDs do not coincide with district boundaries, and in order to avoid a city split, the General Assembly would have needed to add additional VTD splits, but declined to do so.

**Figure 5: Piedmont Triad Major City Boundaries and 2023 District Boundaries**



The second type of analysis pursued by Dr. Ansolabehere was to examine all the voters that were in a given district in *either* the prior map or the new map, differentiating between three types of voters: 1) those that remained in the district across both the 2022 and 2023 Plans—and thus make up the “core” of the district; 2) the voters moved OUT of the district, and 3) the voters moved INTO the district. If the alterations to the district boundaries are unrelated to race, we would not expect the racial composition of the core of the district to differ dramatically from that of the prior district, and we should expect the composition of the voters moved into a district to be similar, on average, to the composition of the voters moved out of the district.

White voters outnumber Black voters in both the 2022 and 2023 versions of the district, so it is not surprising that Whites outnumber Black voters in each of the categories in Table 5. The relevant comparisons are across rows within columns of Table 5. District 6 was radically redrawn, and the racial composition of the (relatively small) core of the district had a slightly higher White share, and smaller Black share, than did the 2022 version of District 6. There was a very substantial difference between those voters moved into and those voters moved out of the district. The percent of self-identified Black voters was larger among those moved out of the district than among those moved into the district by roughly 17 percentage points.



**Table 5: Core/In/Out Analysis for CD 6**

CD 6	Racial Registration	
	Percent Black	Percent White
2022 District	30.66%	55.15%
Core	28.55%	55.37%
Into District	14.66%	72.57%
Out of District	31.54%	55.10%

Again, it is useful to examine breakdowns by party registration. This analysis is provided in Table 6:

**Table 6: Core/In/Out Analysis for CD 6, Broken Down by Partisan Group**

CD 6	Among Democrats		Among Republicans		Among Unaffiliated	
	%B	%W	%B	%W	%B	%W
2022 District	58.92%	30.07%	2.52%	88.25%	19.59%	58.42%
Core	54.75%	31.32%	2.70%	87.58%	18.96%	57.68%
Into District	45.38%	40.68%	0.99%	90.97%	10.10%	72.16%
Out of District	60.66%	29.56%	2.43%	88.55%	19.89%	58.72%
Effects						
Core v. Out	-5.91%	1.75%	0.27%	-0.97%	-0.93%	-1.04%
In v. Out	-15.28%	11.12%	-1.44%	2.41%	-9.80%	13.44%

In Table 6, we can see that the Black share among those moved out of the district is much higher than among those moved into the district for Democrats and unaffiliated voters. At first glance, the raw difference among Republicans appears to be lower, but this is merely because, in the Piedmont Triangle area, Black Republicans are relatively rare. In fact, the Black share among Republicans moved out of the district is more than twice as high as the Black share among Republicans moved into the district.

#### Charlotte Area

In the Charlotte Area, as set forth in Table 7, the “envelope” analysis reveals that those placed within District 12 are disproportionately Black: 82 percent of Black registered voters in the envelope were included in District 12, while only a little more than half of White registered voters were included.

**Table 7: Envelope Analysis for CD 12**

Area	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 12	% of Group that is in CD 12
CD 12	Total	759,082	483,883	63.7%
	White	392,065	206,227	52.6%
	Black	232,318	190,597	82.0%

Table 8 reveals that this large disjuncture is not a mere byproduct of partisanship. It is very large within each partisan category, and once again, the difference is somewhat larger among Republicans. This analysis indicates that District 12 was drawn to encompass a large share of the Black population in the envelope, regardless of party.

**Table 8: Envelope Analysis for CD 12, Broken Down by Partisan Group**

Party of Registration	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 12	% of Group that is in CD 12
Democrat	White	97,135	58,003	59.7%
	Black	173,694	144,055	82.9%
Republican	White	130,802	59,789	45.7%
	Black	5,158	4,102	79.5%
Unaffiliated	White	160,347	86,187	53.8%
	Black	52,521	41,640	79.3%

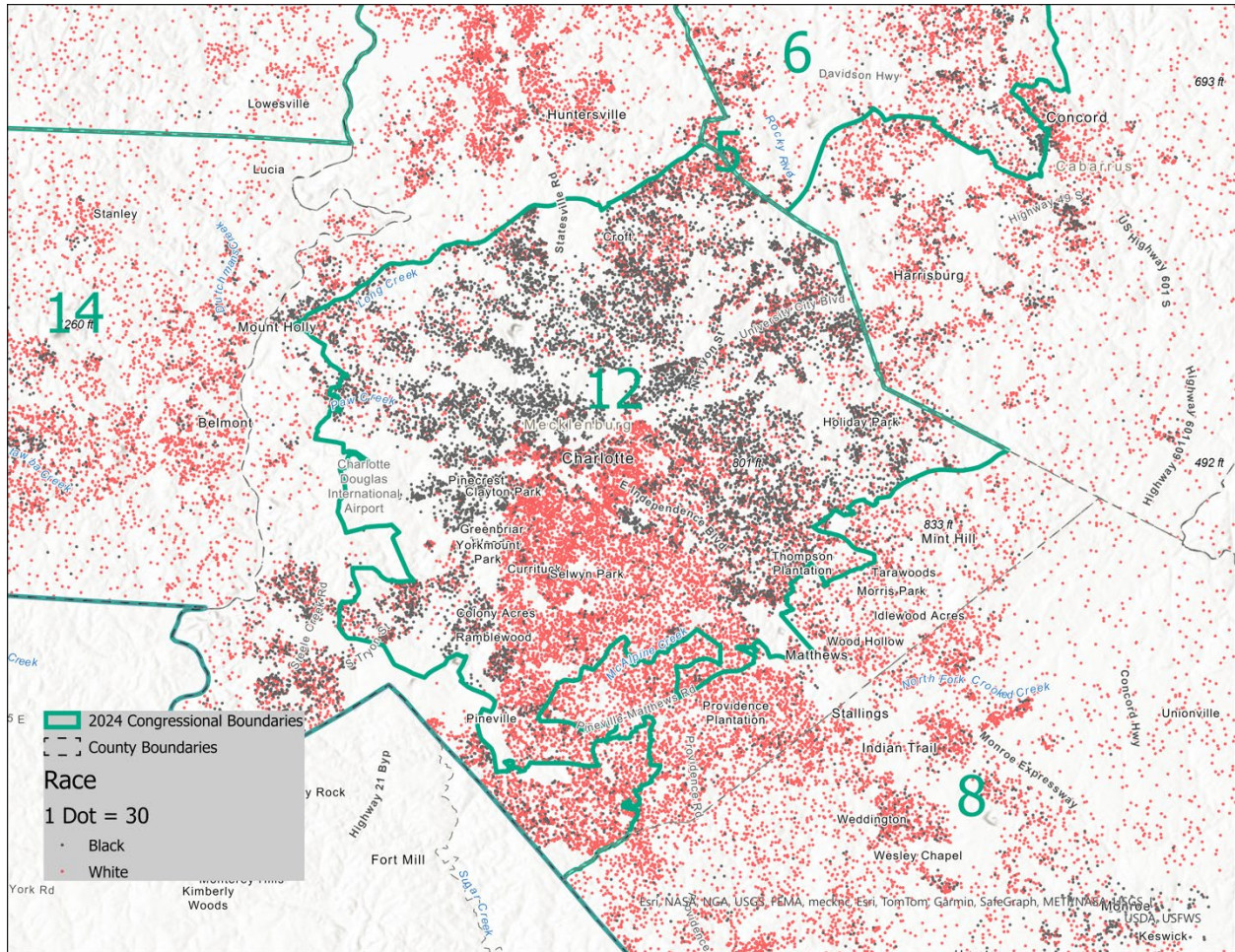
Again, one might suspect that this is driven in some way by geography. In addition to the concern about geographic proximity to the district, one might suspect that this racial difference is driven by whether a VTD is inside or outside the boundary of Charlotte, since it appears that along parts of the district boundary, the General Assembly was following the Charlotte city boundary to some extent, and the city boundary corresponds in some places with racial segregation. To deal with

this, in addition to distance to the median population center of the district, I also include a control variable for whether the individual resides in the city of Charlotte.

The results of the probit model are detailed in the appendix. Again, more distant VTDs within the envelope are significantly less likely to be included in the district, and as expected, Charlotte residents are far more likely to be included in the district. However, even controlling for these two factors, Black voters in the District 12 envelope are far more likely than other voters to be included in the district. The estimated difference from the model including all registered voters and controlling for these two factors in the District 12 envelope is 17 percentage points. The appendix table reveals that the racial difference is also statistically significant in models estimated on Democrats alone, Republicans alone, and unaffiliated voters alone.

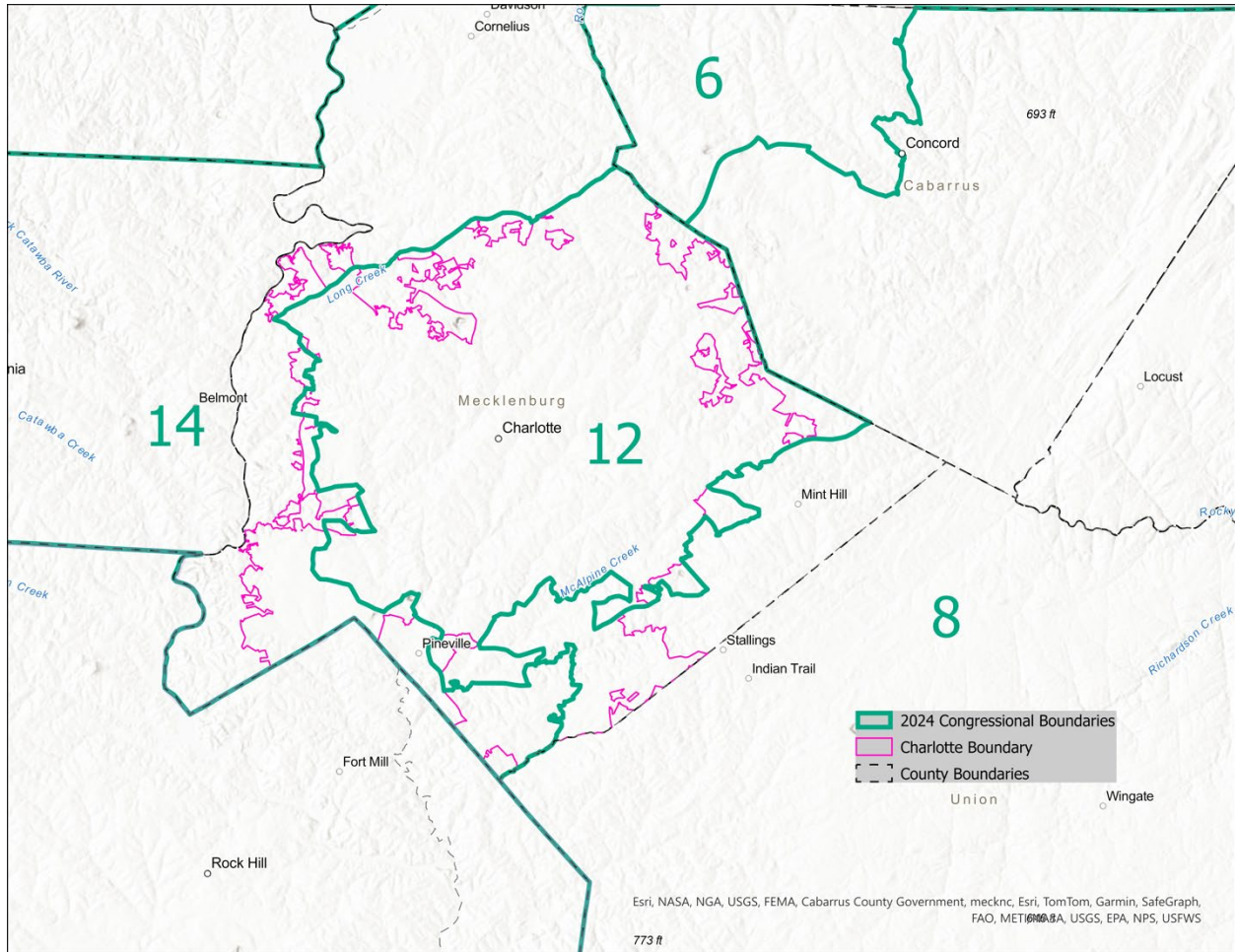
Figure 6 provides a dot density map of Black and White residents in the Charlotte area. It demonstrates a close correspondence between the geography of race and the district boundary. Figure 7 allows for a visualization of the correspondence between the district boundary and the Charlotte city boundary. As mentioned above, Charlotte was unnecessarily divided into three congressional districts rather than two. As Figure 7 demonstrates, municipal preservation was not a high priority when choosing the district boundaries. In the Northeast part of District 12, extending the boundary to the county boundary served to avoid municipal splits. However, on the West side of the district, several non-contiguous parts of Charlotte were included in District 14. The southern part of Charlotte is divided into three different districts, and each of the municipalities to the South and East of Charlotte—Mint Hill, Matthews, and Pineville—were also split.

**Figure 6: Dot Density Map of Race in the Charlotte Area**





**Figure 7: Charlotte City Boundary and 2023 Congressional District Boundaries**



Next, Table 9 displays the racial breakdowns for the district core and the VTDs moved in and out of District 12. The most striking feature of Table 9 is the large Black population selected to form the core of the new district. The Black share of the core is much higher than that of the previous district, and much higher than that of the VTDs moved in or out of the district. Next, Table 9 also reveals that the VTDs moved into the district had higher Black population by around 6 percentage points. Table 10 reveals that both patterns hold up within partisan groups.

**Table 9: Core/In/Out Analysis for CD 12**

CD 12	Racial Registration	
	Percent Black	Percent White
2022 District	36.40%	45.64%
Core	54.49%	25.47%
Into District	23.12%	61.10%
Out of District	17.50%	66.77%

**Table 10: Core/In/Out Analysis for CD 12, Broken Down by Partisan Group**

	Among Democrats		Among Republicans		Among Unaffiliated	
	%B	%W	%B	%W	%B	%W
CD 12						
2022 District	62.93%	22.38%	3.86%	84.69%	23.16%	51.24%
Core	73.35%	12.63%	10.51%	71.56%	35.97%	32.73%
Into District	42.90%	43.33%	2.89%	87.58%	13.77%	65.27%
Out of District	41.87%	42.10%	1.49%	89.30%	11.92%	67.41%
Effects						
Core v. Out	31.48%	-29.47%	9.02%	-17.73%	24.06%	-34.69%
In v. Out	1.03%	1.23%	1.40%	-1.72%	1.85%	-2.14%

District 12 was drawn to concentrate urban Charlotte Black voters into a single district, drawing from District 14. In the 2022 Plan, District 14 was a relatively compact district that focused on the South side of Charlotte, the adjoining suburbs, and Gastonia. The 2023 version of District 14 removes Black Charlotte-area VTDs, placing them in District 12. It features a narrow appendage that reaches around Charlotte to the South, extracting a strip of White exurbs and combining them with White areas to the far West of Charlotte, reaching all the way to the Pisgah National Forest and Chimney Rock State Park.

**Table 11: Envelope Analysis for CD 14**

Area	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 14	% of Group that is in CD 14
CD 14	Total	1,095,732	519,642	47.4%
	White	643,532	367,790	57.2%
	Black	279,015	80,162	28.7%

Table 11 provides the basic “envelope” analysis for District 14. As with District 12, there is strong evidence of racial sorting. While 57 percent of Whites in the envelope were included in District 14, only 29 percent of Blacks were included: a difference of around 28 percentage points. Table 12 shows that this is not merely a function of partisanship. There are large racial differences—between 20 and 30 percentage points—within each partisan category.

**Table 12: Envelope Analysis for CD 14, Broken Down by Partisan Group**

Party of Registration	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 14	% of Group that is in CD 14
Democrat	White	139,966	67,925	48.5%
	Black	208,784	58,956	28.2%
Republican	White	251,223	163,139	64.9%
	Black	6,620	2,281	34.5%
Unaffiliated	White	246,827	133,961	54.3%
	Black	62,508	18,651	29.8%

Again, it is useful to estimate probit models that control for distance to the median population center of the district as well as Charlotte residence. These models, detailed in the appendix, demonstrate that these large differences within partisan categories remain statistically significant when controlling for geographic factors. Even if we account for the possibility that the district-

drawers aimed to draw a more Charlotte-focused version of District 12, Black voters were far more likely to be selected for District 12, and not for District 14.

Next, Table 13 presents information about the core VTDs of District 14 as well as those moved in and out of the district. It demonstrates that the self-identified Black voters were a much larger share of those moved out of the district than of those moved into the district, and Whites were a much larger share of those moved into the district. While Whites made up 77 percent of those moved into the district, they made up 64 percent of those moved out of the district: a difference of around 13 percentage points. Table 14 demonstrates that this basic pattern—Whites disproportionately moving into the district and Blacks out of the district—holds up within each partisan group.

**Table 13: Core/In/Out Analysis for CD 14**

CD 14	Racial Registration	
	Percent Black	Percent White
2022 District	20.07%	63.59%
Core	20.39%	62.61%
Into District	11.62%	77.04%
Out of District	19.82%	64.34%

**Table 14: Core/In/Out Analysis for CD 14, Broken Down by Partisan Group**

	Among Democrats		Among Republicans		Among Unaffiliated	
	%B	%W	%B	%W	%B	%W
CD 14						
2022 District	42.47%	42.36%	1.95%	88.27%	12.83%	65.21%
Core	47.10%	36.32%	1.69%	87.99%	14.18%	62.59%
Into District	33.92%	55.60%	0.96%	90.76%	6.71%	78.24%
Out of District	39.44%	46.32%	2.23%	88.57%	11.89%	67.05%
Effects						
Core v. Out	7.66%	-10.00%	-0.53%	-0.58%	2.29%	-4.46%
In v. Out	-5.51%	9.29%	-1.26%	2.19%	-5.18%	11.19%

### The Northeast

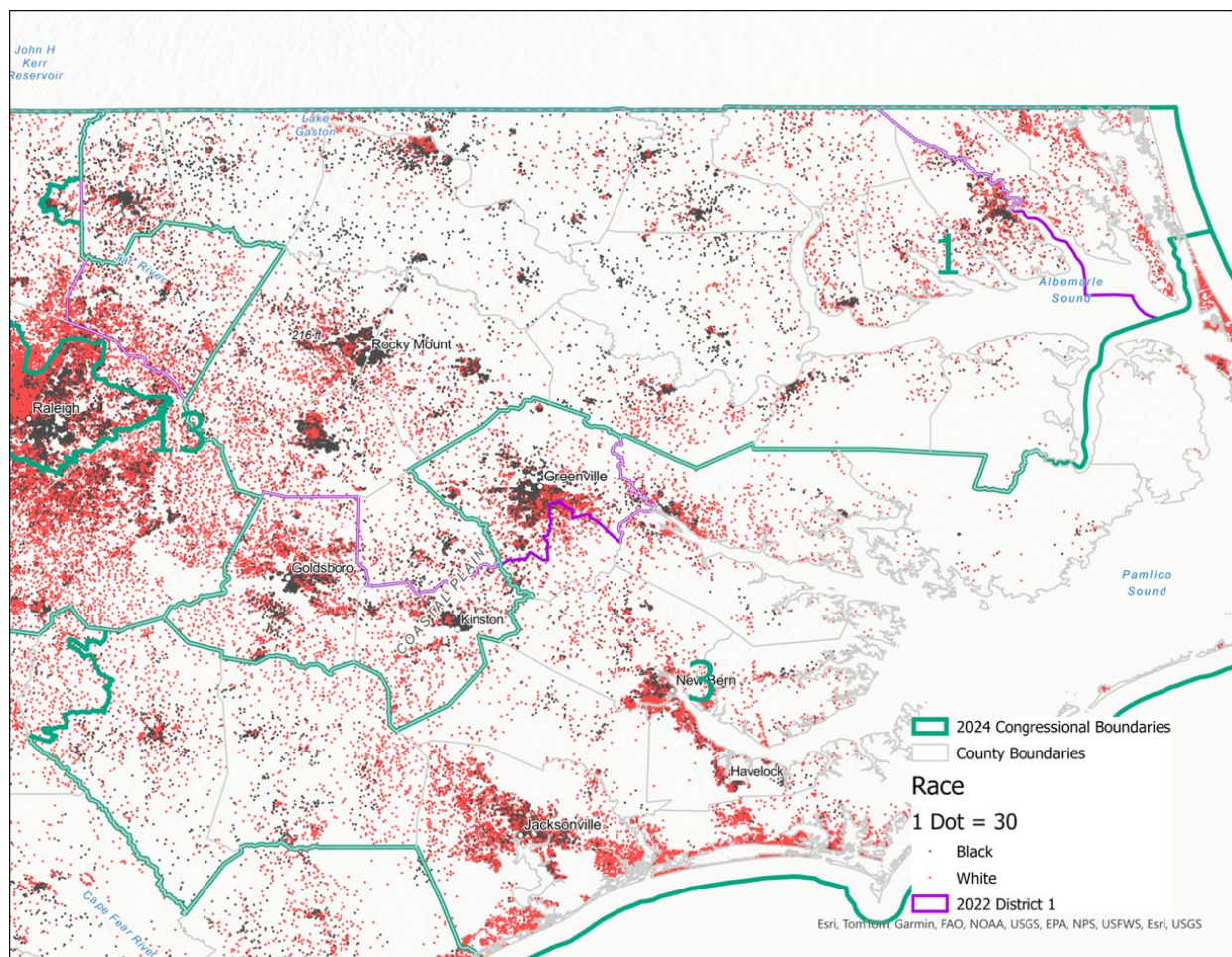
While the impact of the 2023 Plan on the representation of Black voters is relatively clear in the Piedmont Triad, where Black voters were removed from District 6 and scattered across rural districts, and in Charlotte, where they were removed from District 14 and concentrated into District 12, District 1 is different: BVAP declined by less than a single percentage point. Nevertheless, the district was very substantially redrawn (see Figure 8). The largest city in the district, Greenville,



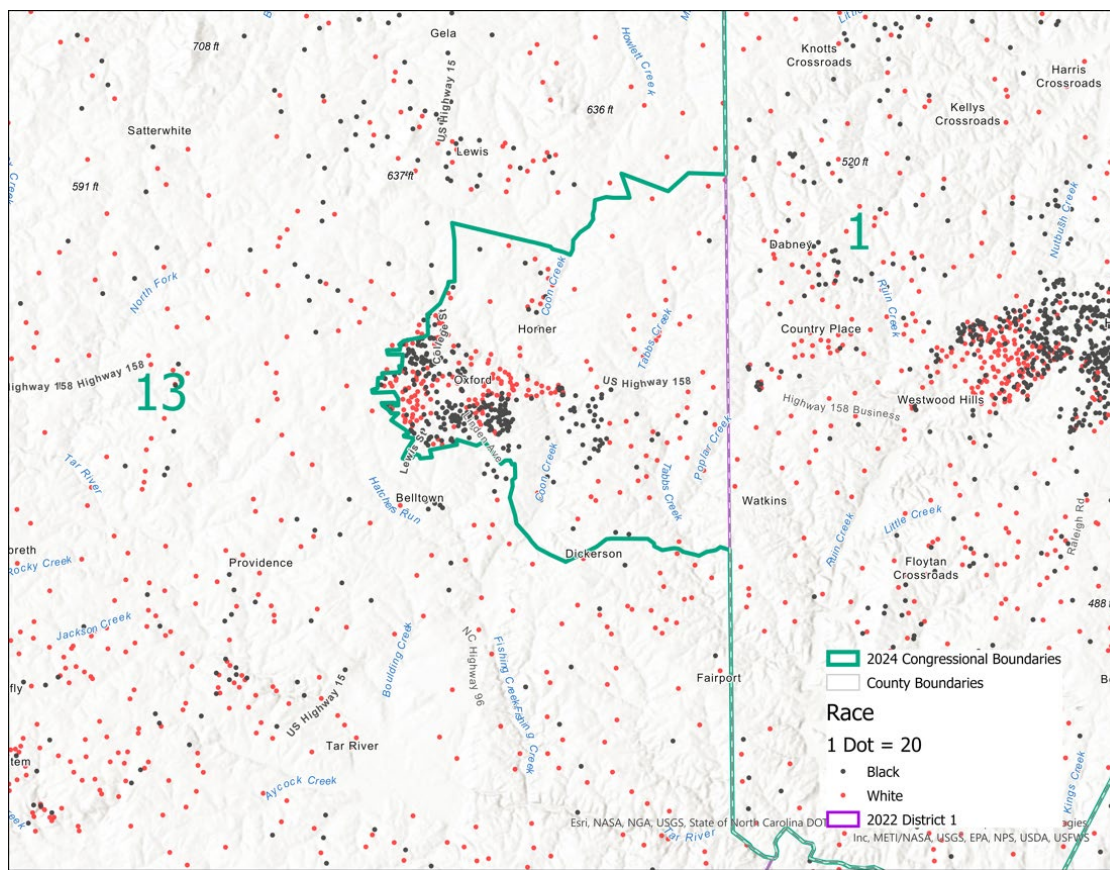
and indeed a large portion of Pitt County, were removed, and along with them, the largest Black enclave in the district. In the previous version of the district, Greenville had been combined with other proximate Black enclaves to its North. The incumbent representative, Don Davis, is from the Greenville metro area, in Greene County, which remains in District 1, although Greenville itself has been removed.

To make up for the large amount of population lost by removing Greenville, the district was extended Eastward to the Atlantic Ocean, bringing in a small population of rural Whites. Most of the lost population was made up by reaching to the Southwest to include Wayne and Lenoir Counties. To reach population equality, additional population was needed. The final VTDs were selected by splitting Granville County, reaching to the West to pull in the majority-Black town of Oxford.

**Figure 8: Dot Density Map of Race, 2023 District 1 Boundaries, and 2022 District 1 Boundaries, Northeast North Carolina**



**Figure 9: Dot Density Map of Race, 2023 District 1 Boundaries, and 2022 District 1 Boundaries, Oxford, NC Area**



Granville is the only split county in District 1, which means that the variation of interest for the “envelope” analysis focuses entirely on one county. In Table 15, note that 94 percent of the registered voters in the envelope are in District 1. Nevertheless, Black voters inside the envelope are somewhat more likely to be placed in District 1 than are White voters (by around 3.5 percentage points). This difference holds up in within partisan groups in Table 16, as well as in the regressions that control for distance to the median population center of the district, reported in the Appendix.

**Table 15: Envelope Analysis for CD 1**

Area	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 1	% of Group that is in CD 1
CD 1	Total	545,195	512,053	93.9%
	White	279,947	259,382	92.7%
	Black	209,588	201,688	96.2%

**Table 16: Envelope Analysis for CD 1, Broken Down by Partisan Group**

Party of Registration	Group	Registered Voters of Group in Envelope	Registered Voters of Group in CD 1	% of Group that is in CD 1
Democrat	White	55,364	51,263	92.6%
	Black	174,282	167,653	96.2%
Republican	White	122,984	114,389	93.0%
	Black	4,737	4,598	97.1%
Unaffiliated	White	99,833	92,107	92.3%
	Black	30,198	29,078	96.3%

The “core/in/out” analysis (Tables 17 and 18) reveals that the core of the district had a large Black population relative to the old district and relative, in the aggregate, to the places that were removed and the places that were added. Table 17 shows that whites were around 60 percent of those moved *into* the district, but around 55 percent of those moved *out*. However, Table 18 suggests that this imbalance was found not among Democrats, but among Republicans and above all, unaffiliated voters. Even if political motivations had a role to play in the redrawing of CD 1, which has become somewhat more Republican after dropping Greenville and adding additional rural counties, it appears that care may have been taken to avoid any major change to the district’s racial statistics—even at the expense of drawing a more Republican district.

**Table 17: Core/In/Out Analysis for CD 1**

CD 1	Racial Registration	
	Percent Black	Percent White
2022 District	39.95%	49.54%
Core	43.59%	47.01%
Into District	29.07%	59.59%
Out of District	31.52%	55.39%



**Table 18: Core/In/Out Analysis for CD 1, Broken Down by Partisan Group**

	Among Democrats		Among Republicans		Among Unaffiliated	
CD 1	%B	%W	%B	%W	%B	%W
2022 District	70.22%	22.59%	3.85%	88.75%	20.31%	61.47%
Core	72.55%	20.81%	4.37%	88.53%	21.99%	61.79%
Into District	66.07%	24.99%	2.28%	89.59%	15.70%	66.84%
Out of District	63.30%	27.85%	2.84%	89.16%	17.15%	60.87%
Effects						
Core v. Out	9.25%	-7.04%	1.53%	-0.63%	4.84%	0.92%
In v. Out	2.77%	-2.86%	-0.56%	0.43%	-1.45%	5.97%

## **V. IMPLICATIONS FOR REPRESENTATION OF RACIAL GROUPS**

The foregoing analysis indicates that the 2023 Plan in North Carolina sorted residents according to race, especially in the Piedmont Triad, where Black urban neighborhoods were extracted from their immediate surroundings and combined with faraway rural White areas, and in Charlotte, where Black voters were concentrated into District 12.

One obvious implication of such maneuvers is that Black voters are less likely to elect their candidates of choice, on average, than are White voters. However, there are additional implications for representation. For those who see value in a system of political representation based on geographic districts, much of the value lies in allowing neighbors who live in the same community, and hence share common interests and concerns, to have the same representative. Arguments for this are multifaceted—voters in the same neighborhood are likely to share political interests; voters in the same area are better able to communicate and coordinate with one another; politicians can better maintain connections with voters in the same area; voters in the same area are especially likely to belong to the same social communities—but all suggest the importance of voters being located in districts with their geographic peers.

For many voters, the reality falls far short of this ideal. Instead, efforts to gerrymander districts result in clusters of voters being carved out of their natural communities and pooled with other voters as part of efforts to dilute their political influence. This may not only undermine the political effectiveness of these voters, but it may also deprive them of the benefits associated with belonging to a coherent constituency.<sup>5</sup> In other words, a perceived danger of “cracking” is that it leads to an abridgment of *local* rights of representation.

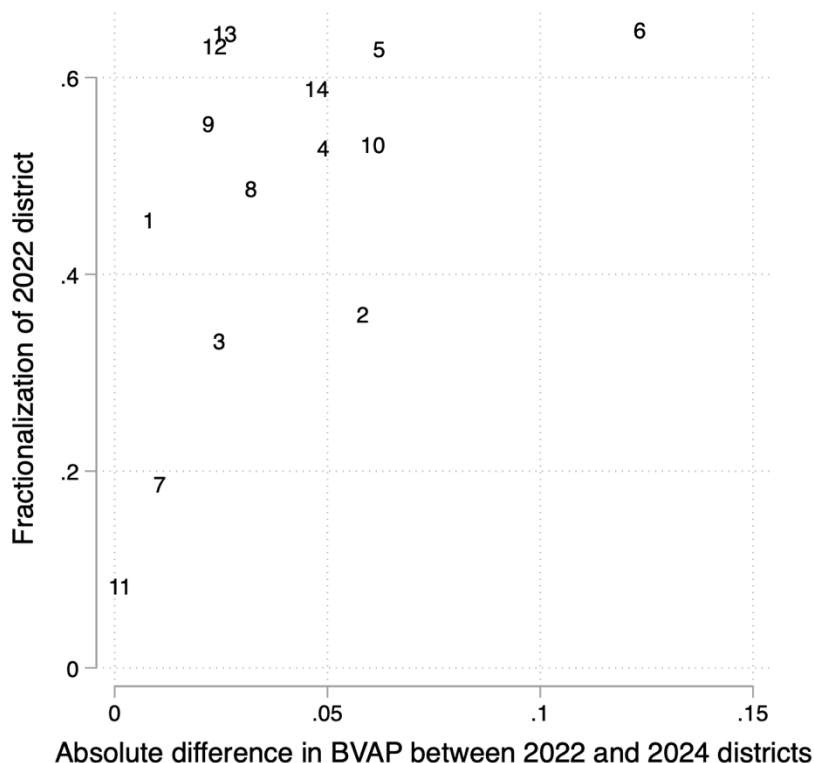
This type of injury associated with strategic line-drawing in the 2023 Plan was disproportionately borne by Black voters. Let us begin by examining the extent to which the 2023 districts upended the geography of the 2022 districts. I have calculated the population size of each fragment into which each 2022 district was carved. The largest fragment of the 2022 district ended up in a 2023 district with the same number in every case but two. In (2022) District 6, the largest fragment is now in (2023) District 5. And in (2022) District 14, the largest fragment is now in (2023) District 12. One way to quantify the obliteration of old districts is to take these fragments and generate an

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<sup>5</sup> See Nicholas Stephanopoulos, 2012, “Spatial Diversity.” *Harvard Law Review* 125:1903–2012.

index of fractionalization for each of the 2022 districts: one minus the Herfindahl-Hirshman index of concentration. This is a commonly used measure of fractionalization, telling us the probability that two randomly selected people from each 2022 district will be in different districts in 2024. A value approaching 1 means that the probability is almost 100 percent that two randomly selected people who were together in a 2022 district will now be in different districts. A value of 0 means that everyone is still in the same district.

**Figure 10: Fractionalization of 2022 Districts and change in BVAP**



In Figure 10, this fractionalization statistic is on the vertical axis. On the horizontal axis is the absolute difference in BVAP between the 2022 version of the district and the 2023 version of the district. Among the districts whose populations ended up being the most fractionalized were Districts 6, 12, and 14, along with the districts heavily affected by their redrawing, including 13, 5, 9, and 10. The upward sloping arrangement of data markers in Figure 10 reveals that where BVAP was increased or decreased most significantly, the district configuration was most radically altered.

Note that District 1 is an outlier. The district's population and geographic structure were changed a great deal, but its BVAP changed surprisingly little, as Greenville-area Black voters were moved out, with an almost equal number of more rural Black residents moved in.

Changes to the map in 2023 disproportionately involved moving Black voters to different districts. Table 19 shows that in the entire state, 38 percent of Black registered voters, and 35 percent of White registered voters were moved to a new district in the 2023 Plan. This difference is driven

almost completely by the Piedmont Triangle counties, where 77 percent of Blacks, and 67 percent of Whites, were moved to a new district. Note that this difference cannot be explained by partisanship. In the counties of the Piedmont Triangle, a large racial difference exists in the likelihood of being moved within each of the major partisan categories.

**Table 19: Who was moved to a different district?**

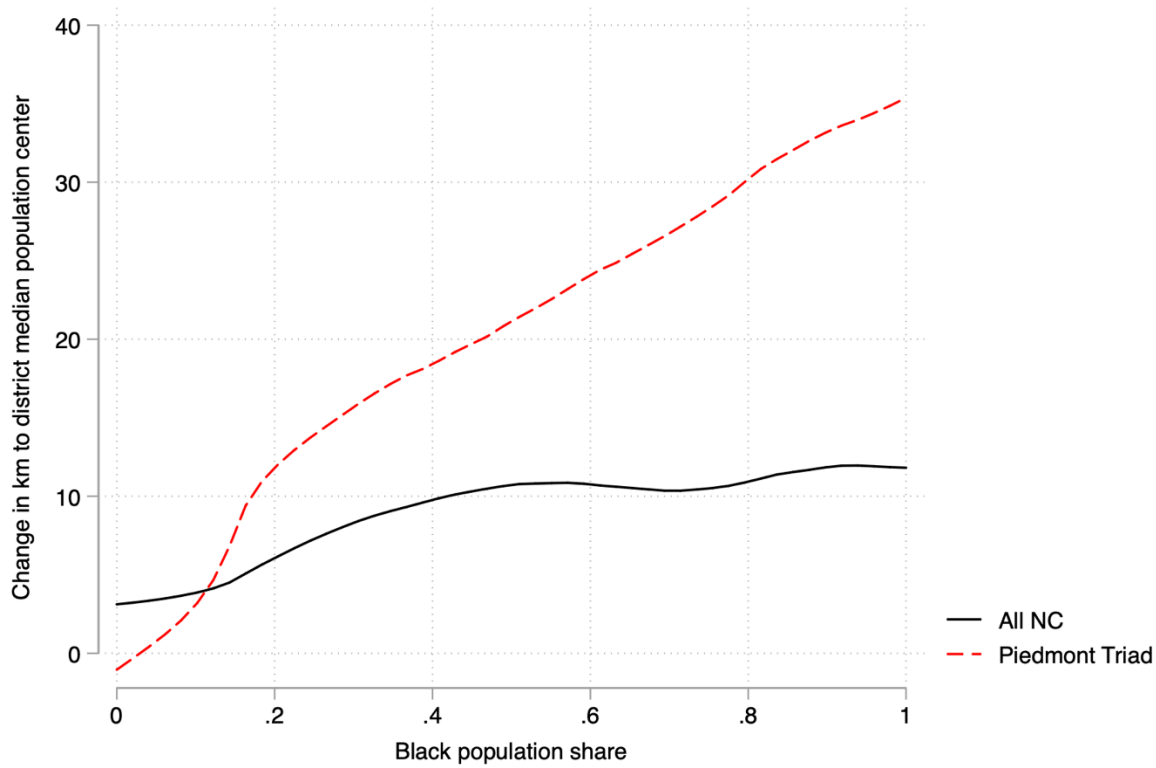
	Percent moved, NC	Percent moved, Piedmont
Black	38.34%	77.03%
Black Democrats	38.31%	77.57%
Black Republicans	37.73%	73.32%
Black Unaffiliated	38.55%	75.50%
White	35.29%	67.14%
White Democrats	33.92%	70.51%
White Republicans	36.10%	64.91%
White Unaffiliated	35.16%	68.43%

Not only were Black voters more likely to be moved to a new district, but they were also more likely to be moved into a non-compact district whose median population center is further away. After using block-level population data from the 2020 Census to locate the median population center of each 2022 district and each 2023 district, I calculate the distance between the centroid of each census block and the median population center of the 2022 district and the 2023 district. I then calculate the change in the distance to the district median population center for each census block from the 2022 redistricting plan to the 2023 plan.

Because the districts in the 2023 Plan are less compact than those of the 2022 Plan, the distance of a census block to the median population center of its assigned district increases on average with the change from the 2022 Plan to the 2023 Plan. We can then examine whether this increase was greater for Black residents. Figure 11 demonstrates the relationship between the Black population share of a census block and the increase in its distance to the median population center of the district associated with the 2023 Plan. The black line is a smoothed local polynomial plot, which shows that this distance increases steadily as the Black population share increases in North Carolina as a whole.

The red line focuses only on the counties of the Piedmont Triad, showing that this relationship is driven by those counties. In the Piedmont Triad, completely White census blocks experienced essentially zero change in their distance from the median population center of the district to which they were assigned. On average, completely Black census blocks moved more than 40 kilometers further from their district's median population center. This is not surprising, since as demonstrated above, the Piedmont Triad districts were drawn to extract Black communities from their cities and neighborhoods, combining them with faraway White rural areas in other parts of the state.

**Figure 11: Change in Distance to Median Population Center of District from 2022 Plan to 2023 Plan, by Race**



In order to shed more light on the impact of breaking apart local communities on representation, it is useful to examine the concept of “dislocation,”<sup>6</sup> which is a way of quantifying the extent to which electoral districts disrupt local, geographically defined communities. Imagine that for each person in North Carolina, there is a bespoke congressional district composed of their nearest 745,670 nearest neighbors. For each Black North Carolina resident, how many members of that bespoke district are also Black? This captures the extent to which the individual lives in a neighborhood—at the scale relevant for drawing congressional districts—with other Black residents. Next, for each Black North Carolina resident, we can ask: how many members of the *district to which they have been assigned* are also Black? For each individual, we can then ask whether the Black population share of the assigned district is larger or smaller than that of the relevant geographic neighborhood. This gives us a sense of whether the racial composition of the district matches that of the neighborhood. Let us refer to this difference as the “racial dislocation” associated with a redistricting plan, and let us refer to negative values of racial dislocation—where a Black voter’s assigned district has a lower proportion of Black voters than their geographic neighborhood—as instances of “racial dilution.”

The larger the difference between the racial composition of the neighborhood and that of the district, the more evidence we have that the districts were drawn in a way that disrupts local clusters

<sup>6</sup> Daryl DeFord, Nick Eubank, and Jonathan Rodden, 2021, “Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering,” *Political Analysis*. <https://doi.org/10.1017/pan.2021.13>

of Black voters. In order to get a broad understanding of whether one set of districts has been drawn in a way that is more inconsistent with the underlying racial geography than another set of districts, we can then evaluate summary statistics for these differences—for distinct areas, for specific proposed districts, and for a redistricting plan as a whole.

For a set of representative voters, Figure 12 maps the difference between the Black share of the district and the Black share of the voter's 745,670 nearest neighbors.<sup>7</sup> The top panel is for the 2022 Plan, and the bottom panel is the 2023 Plan, and the focus is on the Piedmont Triad, where as described above, “cracking” efforts were most overt. This type of display allows us to visualize where the difference is largest—that is to say, where the mismatch between the racial geography of the neighborhood and the district is most pronounced. Non-Black individuals are depicted in gray. The colors correspond to the extent and direction of dislocation experienced by Black voters. Darker colors of green mean that Black voters have been placed in a district where the Black share is *larger* than that of their neighborhood. One might refer to this as “packing.” Darker colors of red indicate that the individual is in a district where the minority population is *lower* than that of the neighborhood. One might refer to this as the “cracking” or “diluting” of Black voters. Lighter colors indicate that the racial composition of the district comes relatively close to the racial composition of the neighborhood.

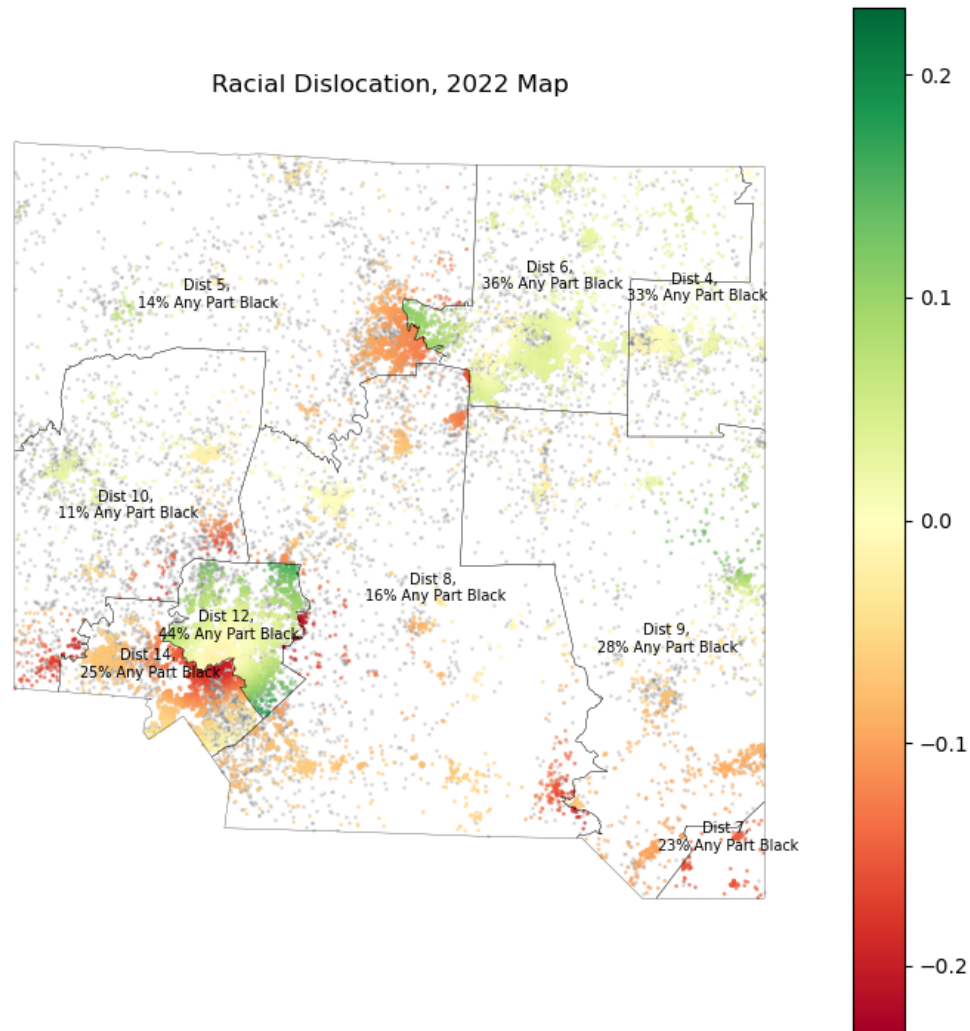
In the Piedmont Triad, in the 2022 Plan, most of the dots in District 6 are relatively light green, meaning that a large part of the Black population of the Piedmont Triad was in a district that matched the neighborhood racial composition, although it also shows that Black voters on the West side of Winston-Salem ended up in District 5, which had a substantially larger White population than their neighborhood. In the 2023 Plan, all shades of green are gone from the Piedmont Triangle. All Black voters are now in a district that has a larger White population than their neighborhood. For residents of Greensboro, which was sliced into three different White-dominated, rural districts, the level of racial dislocation is especially high.

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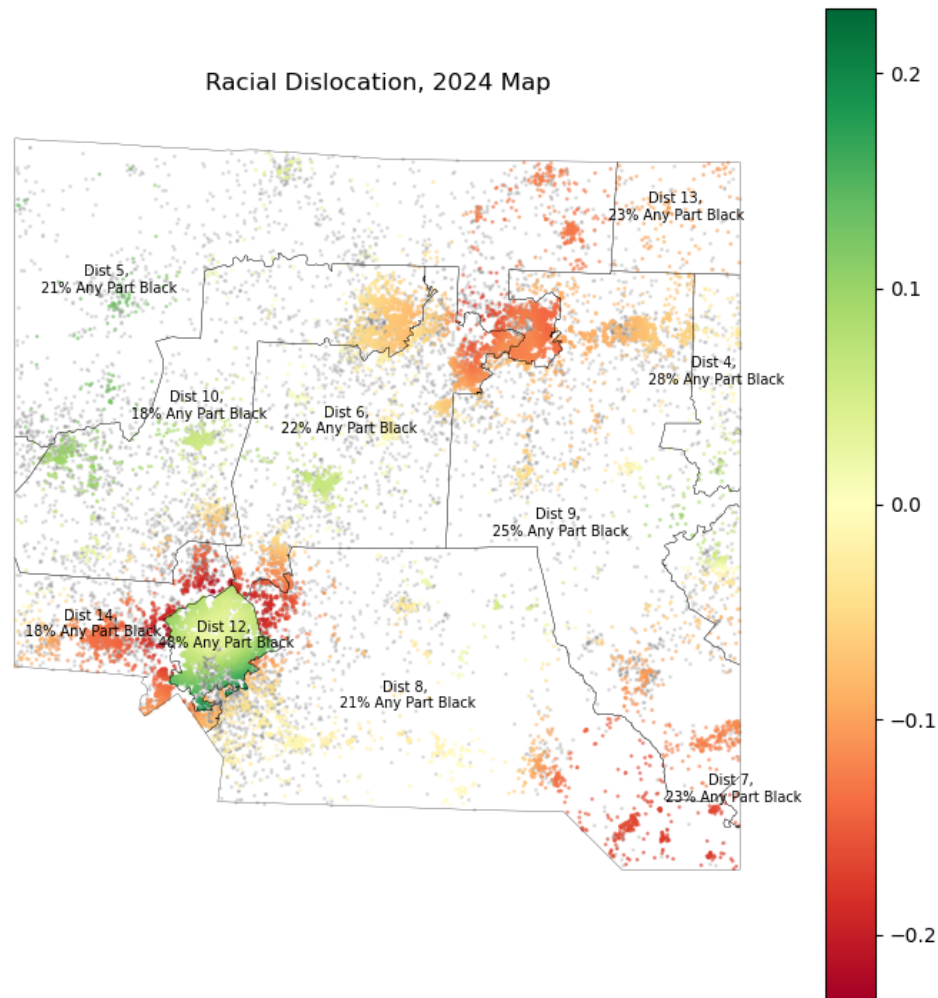
<sup>7</sup> In preparing the dislocation analysis and maps, I received assistance from Nick Eubank, Assistant Research Professor at the Duke University Social Science Research Institute and the Duke University Department of Political Science.



**Figure 12: Racial Dislocation Maps, 2022 and 2023 Congressional Plans**

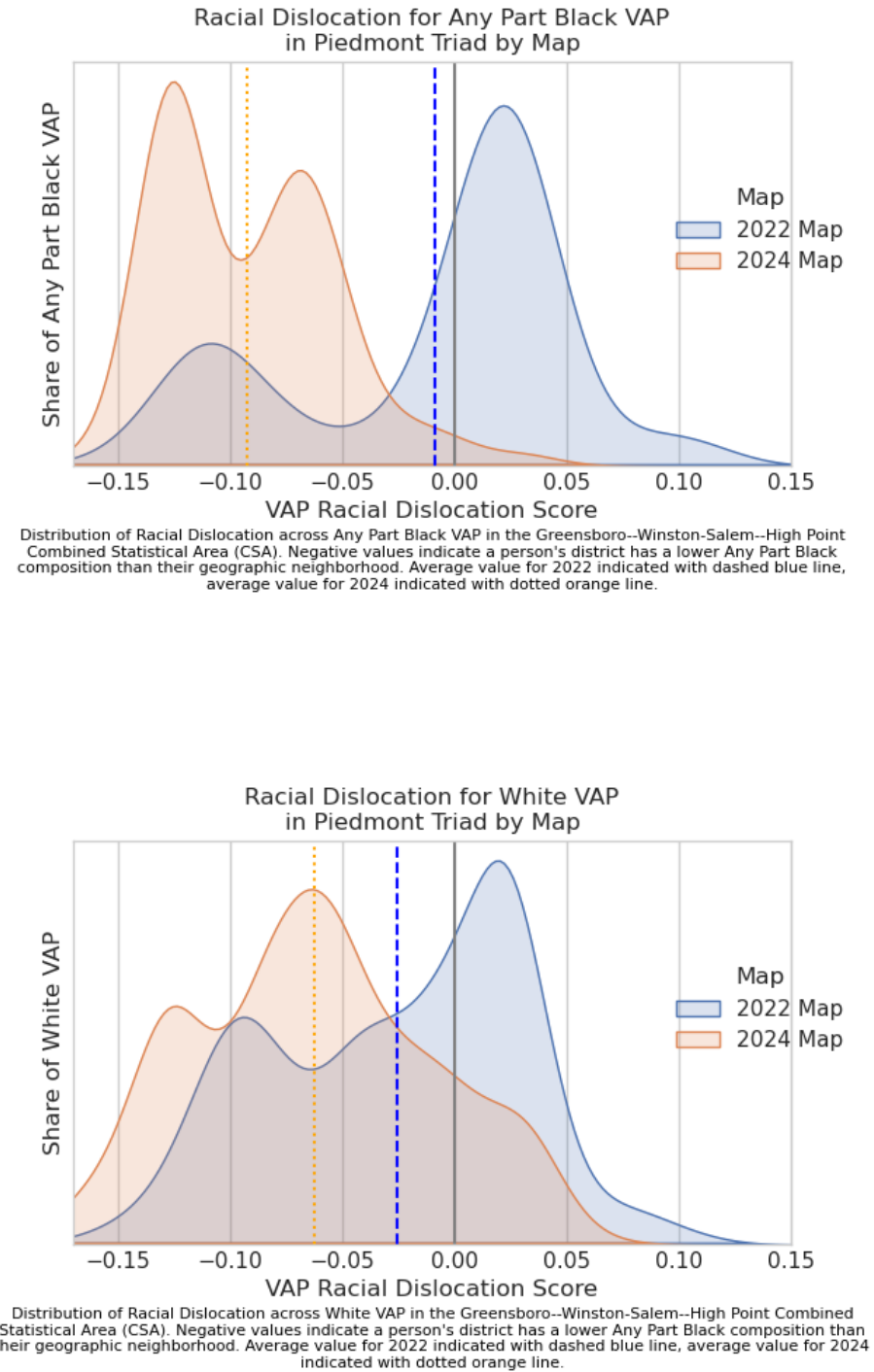


Racial Dislocation is the share Any Part Black of a voter's district minus the share Any Part Black of their k Nearest Neighbors.  
Racial Dislocation only shown for Any Part Black voters — voters who are not Any Part Black in grey.



Racial Dislocation is the share Any Part Black of a voter's district minus the share Any Part Black of their k Nearest Neighbors.  
 Racial Dislocation only shown for Any Part Black voters — voters who are not Any Part Black in grey.

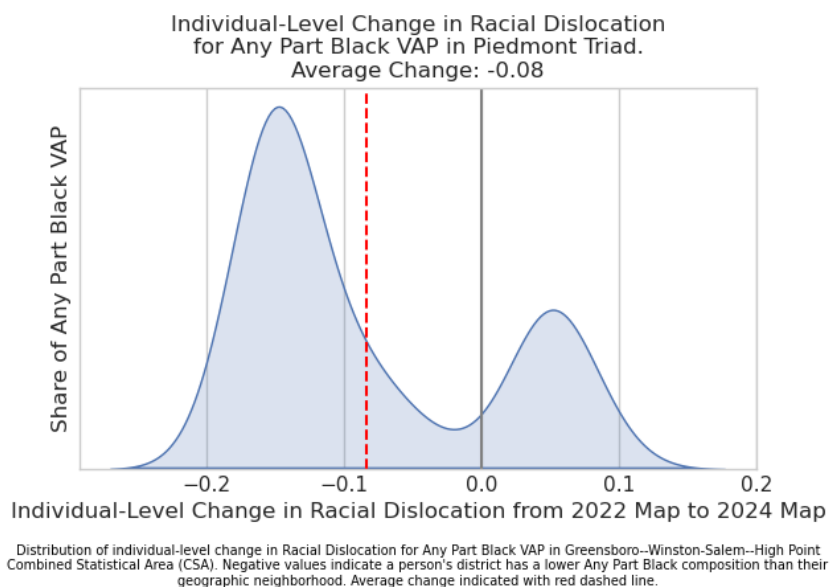
**Figure 13: Racial Dislocation Experienced by Black and White Voters, Piedmont Triad**



To better portray the change between the 2022 and 2023 Plans, Figure 13 provides kernel densities (smoothed histograms) of racial dislocation experienced by Black voters (top panel) and White voters (bottom panel). Note that in a specific location on the map, Black and White voters experience the same magnitude of racial dislocation, but because Black and White voters have different patterns of residential geography, throughout the region, the level of racial dislocation experienced by the two groups can be different.<sup>8</sup> In the top panel of Figure 13, the blue area indicates that in the 2022 Plan, the vast majority of Black voters in the Piedmont Triad lived in places where the Black share of the population was only slightly higher than that of their neighborhood, while a small minority in the left tail of the distribution—mostly the West side of Winston-Salem—were placed in a district that had a much larger White population than the neighborhood. In the 2023 Plan, indicated in red, almost the entire Black population of the Piedmont Triad is now in a district where the White population is far larger than that of the neighborhood. On average, for Black residents in the Piedmont Triad, racial dislocation is quite pronounced: around 9 percentage points.

Throughout the Piedmont Triad, the flip side of this phenomenon is that Whites tend to live in districts that are Whiter than their neighborhood. The second panel of Figure 13 shows that the average level of dislocation experienced by Whites is a bit lower, however, largely because Whites are less likely to live in urban core areas in the Piedmont Triad.

**Figure 14: Change in Racial Dislocation Experienced by Black and White Residents**



<sup>8</sup> Individual-level change in racial dislocation is measured by subtracting the share of a district that is Black from the share of a voter's geographic neighbors who are Black—notwithstanding the race of the individual voter. Consequently, for Black voters, negative values of racial dislocation can be interpreted as “cracking” or “dilution” and positive values can be interpreted as “packing.” For White voters as well, a negative value means that the Black population share is lower than that of the voter's neighborhood, and a positive value indicates that it is higher.

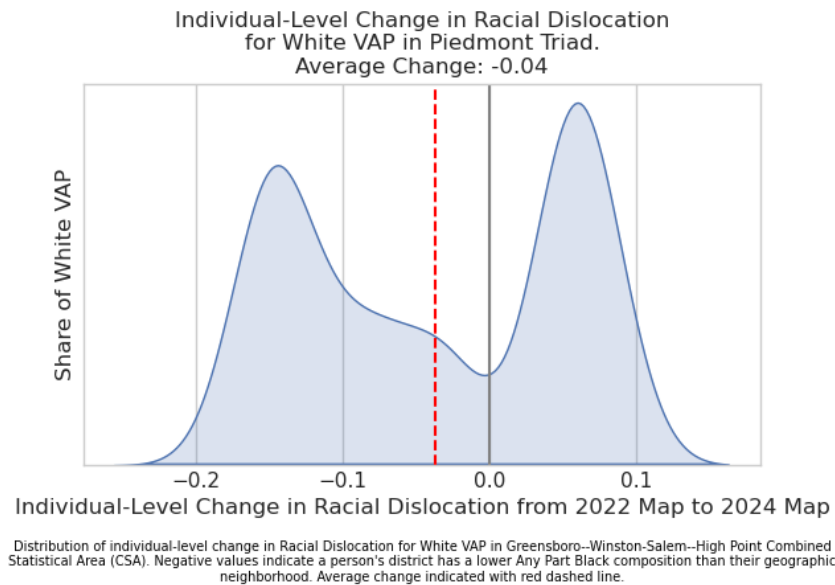


Figure 14 focuses on the *change* in racial dislocation from the 2022 Plan to the 2023 Plan, for Black residents in the top panel and then for Whites in the lower panel. It shows that for most Black residents of the Piedmont Triad, the new map led to a substantial increase in racial dislocation, while for White residents, again due to their different residential geography, the increase was smaller.

In sum, the dislocation analysis provides a useful way of comprehending the implications of “cracking” or “dilution” of geographic communities for representation. When communities are extracted from their geographic context and split from other proximate members of their group, they end up in a district with a demographic composition that is quite different from what they would experience if the district was drawn to keep proximate communities together.

In North Carolina, this means that many Black voters end up in the distant corner of an appendage of a district that is dominated by White voters who live far away, while their neighbors are in the corner of a different district that is dominated by a different set of faraway White voters. This makes it difficult to advocate for common interests in the legislative process.

## VI. CONCLUSION

This report has documented the racial implications of the 2023 Congressional Redistricting Plan in North Carolina. In several of North Carolina’s largest agglomerations, urban Black communities were extracted from their residential context and combined with districts dominated by distant rural White communities. This pattern was most evident in Winston-Salem, High Point, and Greensboro in the Piedmont Triad (District 6), as well as Gastonia (District 14) and Greenville (District 1). In the Charlotte area, Black voters were moved from District 14 to District 12. These moves involved the creation of less compact districts and introduced additional county and municipal splits. The 2023 Plan disproportionately moved Black voters to new districts and moved

them further from the median population center of their district, while often creating large differences between the demographics of the local community and that of the district. Such dispersion makes it difficult for communities to work together, gain the attention of representatives, and achieve shared policy goals.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed on August 1, 2024.

A handwritten signature in black ink, appearing to read 'Jonathan Rodden', written in a cursive style.

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Jonathan Rodden

## APPENDIX

### Envelope Regression Analysis, CD 6

	All registered voters in envelope			Democrats only			Republicans only			Unaffiliated only		
	Marginal effect	Robust SE		Marginal effect	Robust SE		Marginal effect	Robust SE		Marginal effect	Robust SE	
Black	-0.1084	0.0266	***	-0.0581	0.0235	**	-0.0979	0.0329	***	-0.0692	0.0228	***
Distance	-0.0031	0.0007	***	-0.0022	0.0007	***	-0.0042	0.0006	***	-0.0029	0.0007	***
Greensboro	-0.2762	0.0639	***	-0.2117	0.0689	***	-0.3913	0.0581	***	-0.2700	0.0655	***
High Point	0.5091	0.0472	***	0.6276	0.0345	***	0.3545	0.0739	***	0.5068	0.0463	***
Obs.	1,014,004			345,118			319,034			343,308		

### Envelope Regression Analysis, CD 12

	All registered voters in envelope			Democrats only			Republicans only			Unaffiliated only		
	Marginal effect	Robust SE		Marginal effect	Robust SE		Marginal effect	Robust SE		Marginal effect	Robust SE	
Black	0.1677	0.0440	***	0.0573	0.0276	***	0.2943	0.0503	***	0.1689	0.0416	***
Distance	-0.0338	0.0058	***	-0.0129	0.0043	***	-0.0415	0.0062	***	-0.0382	0.0061	***
Charlotte	0.4799	0.1603	***	0.3408	0.1668	***	0.3829	0.1068	***	0.4985	0.1516	***
Obs.	761,896			320,074			153,139			282,788		

### Envelope Regression Analysis, CD 14

	All registered voters			Democrats only			Republicans only			Unaffiliated only		
	Marginal effect	Robust SE		Marginal effect	Robust SE		Marginal effect	Robust SE		Marginal effect	Robust SE	
Black	-0.1239	0.0305	***	-0.0948	0.0256	***	-0.1220	0.0322	***	-0.0955	0.0288	***
Distance	-0.0025	0.0006	***	-0.0029	0.0009	***	-0.0018	0.0004	***	-0.0024	0.0007	***
Charlotte	-0.7956	0.0442	***	-0.8225	0.0400	***	-0.7629	0.0510	***	-0.7830	0.0477	***
Obs.	1,103,055			407,611			288,643			398,597		

Envelope Regression Analysis, CD 1

	All registered voters			Democrats only			Republicans only			Unaffiliated only		
	Marginal	Robust		Marginal	Robust		Marginal	Robust		Marginal	Robust	
	effect	SE		effect	SE		effect	SE		effect	SE	
Black	0.0262	0.0153	**	0.0191	0.0095	***	0.0372	0.0181	***	0.0347	0.0168	***
Distance	-0.0002	0.0001	***	-0.0002	0.0001	***	-0.0002	0.0001	***	-0.0002	0.0001	***
Obs.	545,158			247,740			138,483			156,409		

\*\* p < .05; \*\*\* p < .01



# Exhibit A

# Jonathan Rodden

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## Education

Ph.D. Political Science, Yale University, 2000.

Fulbright Scholar, University of Leipzig, Germany, 1993–1994.

B.A., Political Science, University of Michigan, 1993.

## Academic Positions

Professor, Department of Political Science, Stanford University, 2012–present.

Senior Fellow, Stanford Institute for Economic Policy Research, 2020–present.

Senior Fellow, Hoover Institution, Stanford University, 2012–present.

Director, Spatial Social Science Lab, Stanford University, 2012–present.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, 2010–2012.

Associate Professor, Department of Political Science, Stanford University, 2007–2012.

Fellow, Center for Advanced Study in the Behavioral Sciences, Palo Alto, CA, 2006–2007.

Ford Career Development Associate Professor of Political Science, MIT, 2003–2006.

Visiting Scholar, Center for Basic Research in the Social Sciences, Harvard University, 2004.

Assistant Professor of Political Science, MIT, 1999–2003.

Instructor, Department of Political Science and School of Management, Yale University, 1997–1999.

## Publications

### Books

*Why Cities Lose: The Deep Roots of the Urban-Rural Divide*. Basic Books, 2019.

*Decentralized Governance and Accountability: Academic Research and the Future of Donor Programming*. Co-edited with Erik Wibbels, Cambridge University Press, 2019.

*Hamilton's Paradox: The Promise and Peril of Fiscal Federalism*, Cambridge University Press, 2006. Winner, Gregory Luebbert Award for Best Book in Comparative Politics, 2007; Martha Derthick Award for lasting contribution to the study of federalism, 2021.

*Fiscal Decentralization and the Challenge of Hard Budget Constraints*, MIT Press, 2003. Co-edited with Gunnar Eskeland and Jennie Litvack.

## Peer Reviewed Journal Articles

The Great Global Divider? A Comparison of Urban-Rural Partisan Polarization in Western Democracies, *Comparative Political Studies* (with Twan Huijsmans), <https://doi.org/10.1177/00104140241237458>.

The Great Recession and the Public Sector in Rural America, 2023, *Journal of Economic Geography* <https://doi.org/10.1093/jeg/1bad015>.

How Social Context Affects Immigration Attitudes, 2023, *Journal of Politics* 85( 2): 372-388 (with Adam Berinsky, Christopher Karpowitz, Zeyu Chris Peng, and Cara Wong).

Homicide Deaths Among Adult Cohabitants of Handgun Owners in California, 2004 to 2016: A Cohort Study, 2022, *Annals of Internal Medicine* 175(5): 804-811 (with David M. Studdert, Yifan Zhang, Erin E. Holsinger, Lea Prince, Alexander F. Holsinger, Garen J. Wintemute, and Matthew Miller).

Policies to Influence Perceptions about COVID-19 Risk: The Case of Maps. 2022, *Science Advances* 8(11): 1-9 (with Claudia Engel and Marco Tabellini).

Polarization and Accountability in COVID Times, 2022, *Frontiers in Political Science* January 19, 2022 (with Pablo Beramendi).

Who Registers? Village Networks, Household Dynamics, and Voter Registration in Rural Uganda, 2021, *Comparative Political Studies* 55(6), 899-932, <https://doi.org/10.1177/00104140211036048> (with Romain Ferrali, Guy Grossman, and Melina Platas).

Partisan Dislocation: A Precinct-Level Measure of Representation and Gerrymandering, 2021, *Political Analysis* 30(3), 403-425, doi:10.1017/pan.2021.13 (with Daryl DeFord Nick Eubank).

Who is my Neighbor? The Spatial Efficiency of Partisanship, 2020, *Statistics and Public Policy* 7(1):87-100 (with Nick Eubank).

Handgun Ownership and Suicide in California, 2020, *New England Journal of Medicine* 382: 2220-2229 (with David M. Studdert, Yifan Zhang, Sonja A. Swanson, Lea Prince, Erin E. Holsinger, Matthew J. Spittal, Garen J. Wintemute, and Matthew Miller).

Viral Voting: Social Networks and Political Participation, 2020, *Quarterly Journal of Political Science* 163: 265-284, (with Nick Eubank, Guy Grossman, and Melina Platas). Winner, *Political Ties Award* for the best paper on the subject of political networks.

It Takes a Village: Peer Effects and Externalities in Technology Adoption, 2020, *American Journal of Political Science* 64(3): 536-553, (with Romain Ferrali, Guy Grossman, and Melina Platas). Winner, 2020 Best Conference Paper Award, American Political Science Association Network Section.

Assembly of the LongSHOT Cohort: Public Record Linkage on a Grand Scale, 2019, *Injury Prevention* 26: 153-158 (with Yifan Zhang, Erin Holsinger, Lea Prince, Sonja Swanson, Matthew Miller, Garen Wintemute, and David Studdert).

Crowdsourcing Accountability: ICT for Service Delivery, 2018, *World Development* 112: 74-87 (with Guy Grossman and Melina Platas).

Geography, Uncertainty, and Polarization, 2018, *Political Science Research and Methods* doi:10.1017/psrm.2018.12 (with Nolan McCarty, Boris Shor, Chris Tausanovitch, and Chris Warshaw).

Handgun Acquisitions in California after Two Mass Shootings, 2017, *Annals of Internal Medicine* 166(10):698-706. (with David Studdert, Yifan Zhang, Rob Hyndman, and Garen Wintemute).

Cutting Through the Thicket: Redistricting Simulations and the Detection of Partisan Gerrymanders, 2015, *Election Law Journal* 14(4): 1-15 (with Jowei Chen).

The Achilles Heel of Plurality Systems: Geography and Representation in Multi-Party Democracies, 2015, *American Journal of Political Science* 59(4): 789-805 (with Ernesto Calvo). Winner, Michael Wallerstein Award for best paper in political economy, American Political Science Association.

Why has U.S. Policy Uncertainty Risen Since 1960?, 2014, *American Economic Review: Papers and Proceedings* May 2014 (with Nicholas Bloom, Brandice Canes-Wrone, Scott Baker, and Steven Davis).

Unintentional Gerrymandering: Political Geography and Electoral Bias in Legislatures, 2013, *Quarterly Journal of Political Science* 8: 239-269 (with Jowei Chen).

How Should We Measure District-Level Public Opinion on Individual Issues?, 2012, *Journal of Politics* 74(1): 203-219 (with Chris Warshaw).

Representation and Redistribution in Federations, 2011, *Proceedings of the National Academy of Sciences* 108, 21: 8601-8604 (with Tiberiu Dragu).

Dual Accountability and the Nationalization of Party Competition: Evidence from Four Federations, 2011, *Party Politics* 17, 5: 629-653 (with Erik Wibbels).

The Geographic Distribution of Political Preferences, 2010, *Annual Review of Political Science* 13: 297-340.

Fiscal Decentralization and the Business Cycle: An Empirical Study of Seven Federations, 2009, *Economics and Politics* 22(1): 37-67 (with Erik Wibbels).

Getting into the Game: Legislative Bargaining, Distributive Politics, and EU Enlargement, 2009, *Public Finance and Management* 9(4) (with Deniz Aksoy).

The Strength of Issues: Using Multiple Measures to Gauge Preference Stability, Ideological Constraint, and Issue Voting, 2008. *American Political Science Review* 102(2): 215-232 (with Stephen Ansolabehere and James Snyder).

Does Religion Distract the Poor? Income and Issue Voting Around the World, 2008, *Comparative Political Studies* 41(4): 437-476 (with Ana Lorena De La O).

Purple America, 2006, *Journal of Economic Perspectives* 20(2) (Spring): 97-118 (with Stephen Ansolabehere and James Snyder).

Economic Geography and Economic Voting: Evidence from the U.S. States, 2006, *British Journal of Political Science* 36(3): 527-47 (with Michael Ebeid).

Distributive Politics in a Federation: Electoral Strategies, Legislative Bargaining, and Government Coalitions, 2004, *Dados* 47(3) (with Marta Arretche, in Portuguese).

Comparative Federalism and Decentralization: On Meaning and Measurement, 2004, *Comparative Politics* 36(4): 481-500. (Portuguese version, 2005, in *Revista de Sociologia e Politica* 25).

Reviving Leviathan: Fiscal Federalism and the Growth of Government, 2003, *International Organization* 57 (Fall), 695-729.

Beyond the Fiction of Federalism: Macroeconomic Management in Multi-tiered Systems, 2003, *World Politics* 54(4) (July): 494-531 (with Erik Wibbels).

The Dilemma of Fiscal Federalism: Grants and Fiscal Performance around the World, 2002, *American Journal of Political Science* 46(3): 670-687.

Strength in Numbers: Representation and Redistribution in the European Union, 2002, *European Union Politics* 3(2): 151-175.

Does Federalism Preserve Markets? 1997, *Virginia Law Review* 83(7): 1521-1572 (with Susan Rose-Ackerman). Spanish version, 1999, in *Quorum* 68.

## *Working Papers*

Elections, Political Polarization, and Economic Uncertainty, NBER Working Paper 27961 (with Scott Baker, Aniket Baksy, Nicholas Bloom, and Steven Davis).

Federalism and Inter-regional Redistribution, Working Paper 2009/3, Institut d'Economia de Barcelona.

Representation and Regional Redistribution in Federations, Working Paper 2010/16, Institut d'Economia de Barcelona (with Tiberiu Dragu).

Changing the Default: The Impact of Motor-Voter Reform in Colorado (with Justin Grimmer), 2022.

## *Chapters in Books*

Recessions and Ratchets: Federal Funds and Public Sector Employment, in *American Federalism Today*, edited by Michael Boskin, Hoover Institution Press.

The Urban-Rural Divide in Historical Political Economy, in *Oxford Handbook of Historical Political Economy*, edited by Jeffery A. Jenkins and Jared Rubin, 2023, Oxford University Press.

Political Geography and Representation: A Case Study of Districting in Pennsylvania (with Thomas Weighill), in *Political Geometry*, edited by Moon Duchin and Olivia Walch, 2022, Springer.

Keeping Your Enemies Close: Electoral Rules and Partisan Polarization, in *The New Politics of Insecurity*, edited by Frances Rosenbluth and Margaret Weir, 2022, Cambridge University Press.

Decentralized Rule and Revenue, 2019, in Jonathan Rodden and Erik Wibbels, eds., *Decentralized Governance and Accountability*, Cambridge University Press.

Geography and Gridlock in the United States, 2014, in Nathaniel Persily, ed. *Solutions to Political Polarization in America*, Cambridge University Press.

Can Market Discipline Survive in the U.S. Federation?, 2013, in Daniel Nadler and Paul Peterson, eds, *The Global Debt Crisis: Haunting U.S. and European Federalism*, Brookings Press.

Market Discipline and U.S. Federalism, 2012, in Peter Conti-Brown and David A. Skeel, Jr., eds, *When States Go Broke: The Origins, Context, and Solutions for the American States in Fiscal Crisis*, Cambridge University Press.

Federalism and Inter-Regional Redistribution, 2010, in Nuria Bosch, Marta Espasa, and Albert Sole Olle, eds., *The Political Economy of Inter-Regional Fiscal Flows*, Edward Elgar.

Back to the Future: Endogenous Institutions and Comparative Politics, 2009, in Mark Lichbach and Alan Zuckerman, eds., *Comparative Politics: Rationality, Culture, and Structure* (Second Edition), Cambridge University Press.

The Political Economy of Federalism, 2006, in Barry Weingast and Donald Wittman, eds., *Oxford Handbook of Political Economy*, Oxford University Press.

Fiscal Discipline in Federations: Germany and the EMU, 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

The Political Economy of Pro-cyclical Decentralised Finance (with Erik Wibbels), 2006, in Peter Wierts, Servaas Deroose, Elena Flores and Alessandro Turrini, eds., *Fiscal Policy Surveillance in Europe*, Palgrave MacMillan.

Globalization and Fiscal Decentralization, (with Geoffrey Garrett), 2003, in Miles Kahler and David Lake, eds., *Governance in a Global Economy: Political Authority in Transition*, Princeton University Press: 87-109. (Updated version, 2007, in David Cameron, Gustav Ranis, and Annalisa Zinn, eds., *Globalization and Self-Determination: Is the Nation-State under Siege?* Routledge.)

Introduction and Overview (Chapter 1), 2003, in Rodden et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Soft Budget Constraints and German Federalism (Chapter 5), 2003, in Rodden, et al, *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Federalism and Bailouts in Brazil (Chapter 7), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

Lessons and Conclusions (Chapter 13), 2003, in Rodden, et al., *Fiscal Decentralization and the Challenge of Hard Budget Constraints* (see above).

### *Online Interactive Visualization*

Stanford Election Atlas, 2012 (collaboration with Stephen Ansolabehere at Harvard and Jim Herries at ESRI)

### *Other Publications*

Supporting Advanced Manufacturing in Alabama, Report to the Alabama Innovation Commission, Hoover Institution, 2021.

How America's Urban-Rural Divide has Shaped the Pandemic, 2020, *Foreign Affairs*, April 20, 2020.

An Evolutionary Path for the European Monetary Fund? A Comparative Perspective, 2017, Briefing paper for the Economic and Financial Affairs Committee of the European Parliament.

Amicus Brief in *Rucho et al. v. Common Cause*, 2019, Supreme Court of the United States, with Wesley Pegden and Samuel Wang.

Amicus Brief in *Gill et al. v. Whitford et al.*, 2017, Supreme Court of the United States, with Jowei Chen and Wesley Pegden.

Representation and Regional Redistribution in Federations: A Research Report, 2009, in *World Report on Fiscal Federalism*, Institut d'Economia de Barcelona.

On the Migration of Fiscal Sovereignty, 2004, *PS: Political Science and Politics* July, 2004: 427-431.

Decentralization and the Challenge of Hard Budget Constraints, *PREM Note* 41, Poverty Reduction and Economic Management Unit, World Bank, Washington, D.C. (July).

Decentralization and Hard Budget Constraints, *APSA-CP* (Newsletter of the Organized Section in Comparative Politics, American Political Science Association) 11:1 (with Jennie Litvack).

Book Review of *The Government of Money* by Peter Johnson, *Comparative Political Studies* 32,7: 897-900.



## Fellowships, Honors, and Grants

National Science Foundation, funding for study "Segregation, Suburbanization, and Representation," 2023.

John Simon Guggenheim Memorial Foundation Fellowship, 2021.

Martha Derthick Award of the American Political Science Association for "the best book published at least ten years ago that has made a lasting contribution to the study of federalism and intergovernmental relations," 2021.

National Institutes of Health, funding for "Relationship between lawful handgun ownership and risk of homicide victimization in the home," 2021-2024.

National Collaborative on Gun Violence Research, funding for "Cohort Study Of Firearm-Related Mortality Among Cohabitants Of Handgun Owners." 2020.

Fund for a Safer Future, Longitudinal Study of Handgun Ownership and Transfer (LongSHOT), GA004696, 2017-2018.

Stanford Institute for Innovation in Developing Economies, Innovation and Entrepreneurship research grant, 2015.

Michael Wallerstein Award for best paper in political economy, American Political Science Association, 2016.

Common Cause Gerrymandering Standard Writing Competition, 2015.

General support grant from the Hewlett Foundation for Spatial Social Science Lab, 2014.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2012.

Sloan Foundation, grant for assembly of geo-referenced precinct-level electoral data set (with Stephen Ansolabehere and James Snyder), 2009-2011.

Hoagland Award Fund for Innovations in Undergraduate Teaching, Stanford University, 2009.

W. Glenn Campbell and Rita Ricardo-Campbell National Fellow, Hoover Institution, Stanford University, beginning Fall 2010.

Research Grant on Fiscal Federalism, Institut d'Economia de Barcelona, 2009.

Fellow, Institute for Research in the Social Sciences, Stanford University, 2008.

United Postal Service Foundation grant for study of the spatial distribution of income in cities, 2008.

Gregory Luebbert Award for Best Book in Comparative Politics, 2007.

Fellow, Center for Advanced Study in the Behavioral Sciences, 2006-2007.

National Science Foundation grant for assembly of cross-national provincial-level dataset on elections, public finance, and government composition, 2003-2004 (with Erik Wibbels).

MIT Dean's Fund and School of Humanities, Arts, and Social Sciences Research Funds.

Funding from DAAD (German Academic Exchange Service), MIT, and Harvard EU Center to organize the conference, "European Fiscal Federalism in Comparative Perspective," held at Harvard University, November 4, 2000.

Canadian Studies Fellowship (Canadian Federal Government), 1996-1997.

Prize Teaching Fellowship, Yale University, 1998-1999.

Fulbright Grant, University of Leipzig, Germany, 1993-1994.

Michigan Association of Governing Boards Award, one of two top graduating students at the University of Michigan, 1993.

W. J. Bryan Prize, top graduating senior in political science department at the University of Michigan, 1993.

## Other Professional Activities

Selection committee, best paper award, American Journal of Political Science.

Selection committee, best paper award, American Political Economy

International Advisory Committee, Center for Metropolitan Studies, Sao Paulo, Brazil, 2006–2010.

Selection committee, Mancur Olson Prize awarded by the American Political Science Association Political Economy Section for the best dissertation in the field of political economy.

Selection committee, Gregory Luebbert Best Book Award.

Selection committee, William Anderson Prize, awarded by the American Political Science Association for the best dissertation in the field of federalism and intergovernmental relations.

## Courses

### *Undergraduate*

Politics, Economics, and Democracy

Introduction to Comparative Politics

Introduction to Political Science

Political Science Scope and Methods

Institutional Economics

Spatial Approaches to Social Science

### *Graduate*

Political Economy

Political Economy of Institutions

Federalism and Fiscal Decentralization

Politics and Geography

## Consulting

2017. Economic and Financial Affairs Committee of the European Parliament.
2016. Briefing paper for the World Bank on fiscal federalism in Brazil.
- 2013-2018: Principal Investigator, SMS for Better Governance (a collaborative project involving USAID, Social Impact, and UNICEF in Arua, Uganda).
2023. Expert witness in *Agee, Jr. et al v. Benson et al*, No. 1:22-cv-00272 (W.D. Mi. 2023).
2022. Expert witness in *Rivera v. Schwab* No. 2022-cv-89 (Kan. Dist. Ct. 2022)
2022. Drew Pennsylvania Congressional redistricting plan that was chosen by the Pennsylvania Supreme Court for implementation in *Carter v. Chapman* No. 7 MM 2022, 2022WL 549106 (Pennsylvania Supreme Court).
2022. Written expert testimony in *Benninghoff v. 2021 Legislative Reapportionment Commission* (Pennsylvania Supreme Court).
- 2022 Expert witness in *Bennett v. Ohio Redistricting Commission*, No. 2012-1198 (Ohio Supreme Court).
- 2022 Expert witness in *Adams v. DeWine* No. 2012-1428 (Ohio Supreme Court).
- 2022 Expert witness in *Neiman v. LaRose* No. 2022-0298 (Ohio Supreme Court)
- 2019: Written expert testimony in *McLemore, Holmes, Robinson, and Woullard v. Hosemann*, United States District Court, Mississippi.
- 2019: Expert witness in *Nancy Corola Jacobson v. Detzner*, United States District Court, Florida.
- 2018: Written expert testimony in *League of Women Voters of Florida v. Detzner* No. 4:18-cv-002510, United States District Court, Florida.
- 2018: Written expert testimony in *College Democrats of the University of Michigan, et al. v. Johnson, et al.*, United States District Court for the Eastern District of Michigan.
- 2017: Expert witness in *Bethune-Hill v. Virginia Board of Elections*, No. 3:14-CV-00852, United States District Court for the Eastern District of Virginia.
- 2017: Expert witness in *Arizona Democratic Party, et al. v. Reagan, et al.*, No. 2:16-CV-01065, United States District Court for Arizona.
- 2016: Expert witness in *Lee v. Virginia Board of Elections*, 3:15-cv-357, United States District Court for the Eastern District of Virginia, Richmond Division.
- 2016: Expert witness in *Missouri NAACP v. Ferguson-Florissant School District*, United States District Court for the Eastern District of Missouri, Eastern Division.
- 2014-2015: Written expert testimony in *League of Women Voters of Florida et al. v. Detzner, et al.*, 2012-CA-002842 in Florida Circuit Court, Leon County (Florida Senate redistricting case).
- 2013-2014: Expert witness in *Romo v Detzner*, 2012-CA-000412 in Florida Circuit Court, Leon County (Florida Congressional redistricting case).
- 2011-2014: Consultation with investment groups and hedge funds on European debt crisis.
- 2011-2014: Lead Outcome Expert, Democracy and Governance, USAID and Social Impact.

2010: USAID, Review of USAID analysis of decentralization in Africa.

2006–2009: World Bank, Independent Evaluations Group. Undertook evaluations of World Bank decentralization and safety net programs.

2008–2011: International Monetary Fund Institute. Designed and taught course on fiscal federalism.

1998–2003: World Bank, Poverty Reduction and Economic Management Unit. Consultant for *World Development Report*, lecturer for training courses, participant in working group for assembly of decentralization data, director of multi-country study of fiscal discipline in decentralized countries, collaborator on review of subnational adjustment lending.

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